JWA PTY LTD
Ecological Consultants
ABN 56 066 448 879

ECOLOGICAL ASSESSMENT

Mountain Ash Road, Gundary

A report prepared for
Windellama Road Pty Ltd & GTSMF Pty Ltd

JULY 2022

JWA Pty Ltd

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ABBREVIATIONS

Abbreviation	Description
ALA	Atlas of Living Australia
BAM	Biodiversity Assessment Method
BC Act	NSW Biodiversity Conservation Act 2016
BCR	Biodiversity Conservation Regulation 2017
BOS	Biodiversity Offset Scheme
BV Map	Biodiversity Values Map
CEEC	Critically Endangered Ecological Community
CM Map	Coastal Management Act 2016
DAWE	Australian Government Department of Agriculture, Water and the Environment
DoPIE	Department of Planning, Industry and Environment
DotE	Department of the Environment
EA	Ecological Assessment
ECA	Ecological Constraints Analysis
EEC	Endangered Ecological Community
EPA Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FM Act	Fisheries Management Act 1994
GMC	Goulburn Mulwaree Council
GMLEP	Goulburn Mulwaree Local Environmental Plan 2009
GMLGA	Goulburn Mulwaree Local Government Area
Ha	Hectare
JWA Pty Ltd	JWA Ecological Consultants Pty Ltd
Km	Kilometre
LEP	Local Environmental Plan
LGA	Local Government Area
LLS Act	Local Land Services Act 2013
m	Metres
mm	Millimetres
MNES	Matters of National Environmental Significance
NSW	New South Wales
NTG-SEH	Natural temperate grassland of the south eastern highlands
NVR Map	Native Vegetation Regulatory Map
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PKFT	Preferred Koala Food Tree
PMST	Protected Matters Search Tool
RU	Primary Production zoning
SEED	Sharing and Enabling Environmental Data
SEPP	State Environmental Protection Policy
TEC	Threatened Ecological Community
TSSC	Threatened Species Scientific Committee
VZ	Vegetation Zone

1 INTRODUCTION

1.1 Background

JWA Pty Ltd were previously engaged by Windellama Road Pty Ltd & GTSMF Pty Ltd to complete an Ecological Constraints Analysis (ECA) of a parcel of land on Mountain Ash Road, Gundary, New South Wales (NSW) (hereafter referred to as the 'subject site').

The ECA involved a desktop review was undertaken to identify any Commonwealth, State and Local environmental constraints that may apply to the subject site. These include, but may not be limited to the following:

- the presence of any commonwealth, state and/or locally threatened vegetation / ecological communities;
- the presence of, or likelihood of occurrence of any commonwealth, state and/or locally threatened flora and fauna species; and
- habitat and corridor values at a local and regional scale.

Based on the outcomes of the ECA, any ecological constraints occurring on the subject site were allocated to a category ranging from high to low depending upon the following assessment criteria:

- Presence of significant flora species;
- Presence of significant vegetation communities/ecosystems;
- Presence of significant fauna species and/or their habitat; and
- Recognition of environmental values in planning and policy documents.

Following the ECA, and during subsequent meetings with Goulburn Mulwaree Council (GMC) on 7th December 2021 and 17th February 2022, GMC officers indicated the need for targeted field surveys to determine the presence (or likely presence) of threatened flora and fauna species and threatened ecological communities (TECs), and the preparation of an Ecological Assessment report to development application standards.

This Ecological Assessment (EA) has involved the following:

- Mapping and ground truthing vegetation units and determining their conservation status;
- Searching for and recording threatened and regionally significant plant species;
- Determining the suite of threatened fauna that occurs in the locality and assessing their potential occurrence on the subject site;
- Assessing habitat provided by the site in relation to adjacent habitat and making an assessment of the corridor value of the subject site;
- Addressing statutory requirements including *State Environmental Planning Policy (Biodiversity and Conservation) 2021*, *State Environmental Planning Policy (Resilience and Hazards) 2021*, *Biodiversity Conservation Act 2016* (BC Act) and the

Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act); and

- Assessment of the proposed development against the *Goulburn Mulwaree Local Environmental Plan 2012* (GWLEP) (GMC 2009).

1.2 The subject site

The subject site is ~265 ha in size and is formally identified as the following (**FIGURE 1**):

- Lot 1 on DP779194
- Lot 1 on DP731427
- Lot 1 on DP853498
- Lot 103 on DP70346
- Lots 1, 2, 3, on DP835278
- Lots 22, 23, 24 on DP811954
- Lot 104, 105, 106 on DP126140

The subject site is located ~5 km to the south, southeast of regional city of Goulburn, NSW. It is bounded entirely by a cleared and managed landscape utilised for rural residential, agricultural and/or grazing purposes (**PHOTO PLATES 1-2)**. The Goulburn airport is ~1 km to the southwest of the subject site. An aerial photograph of the site is shown in **FIGURE 2**.

The subject site is characterised by flat to slightly undulating terrain dominated by cleared and historically managed grassland, with minimal native forest cover (**PHOTO PLATES 1-2**). There are numerous stock dams present (**PHOTO PLATE 2**), along with watercourses / drainage lines traversing the subject site towards Gundary Creek to the west.

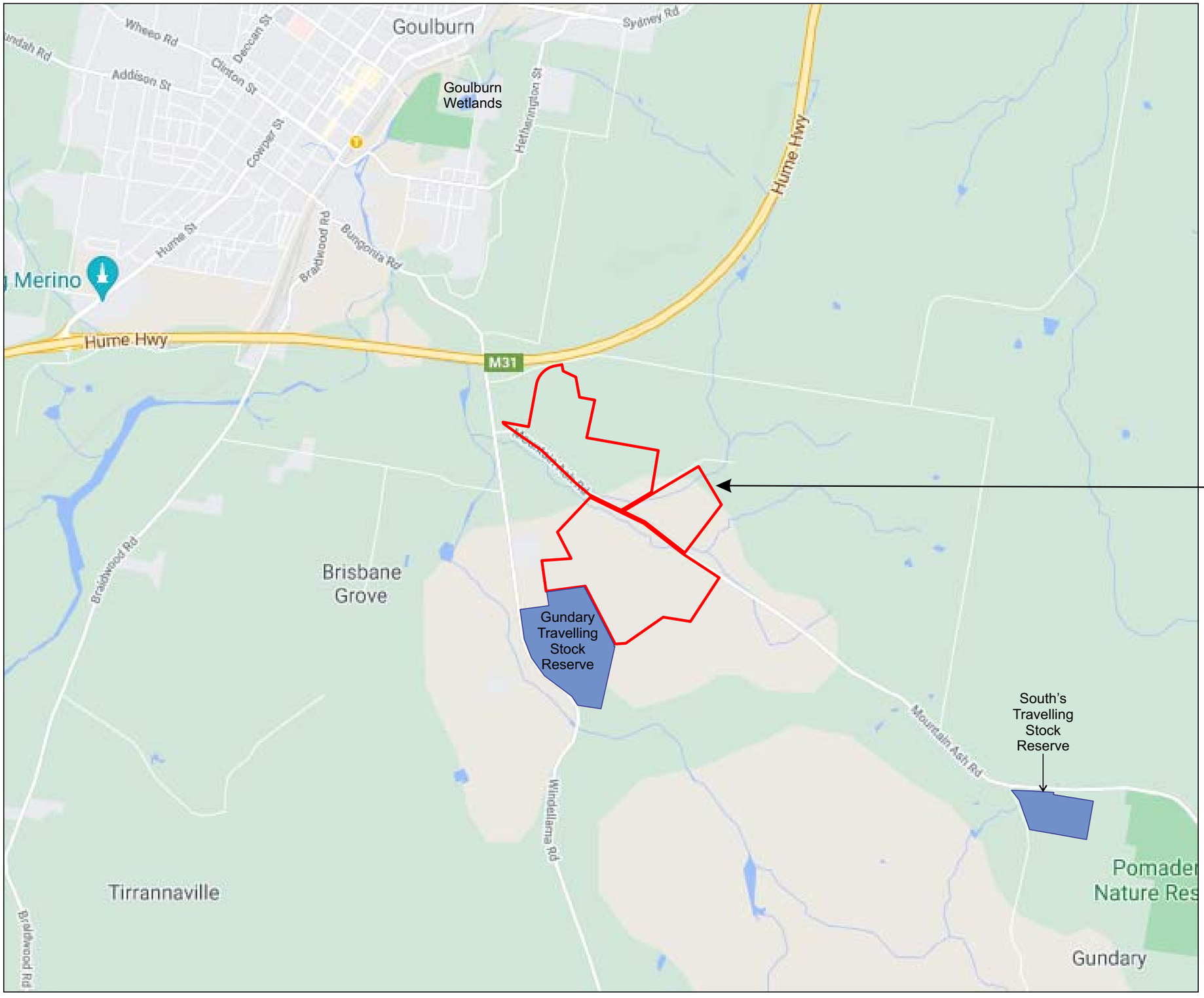
A number ecologically important areas occur within the locality including (**FIGURE 1**):

- Gundary Travelling Stock Reserve – immediately to the south-west;
- South's Travelling Stock Reserve – approx. 3.4 km to the south-east;
- Pomaderris Nature Reserve - approx. 4.5 km to the south-east; and
- the Goulburn Wetlands - approx. 2.6 km to the north.

1.3 Planning context

The subject site is located within the Goulburn Mulwaree Local Government Area (GMLGA) and is zoned as Primary Production (RU1)[1] under the *Goulburn Mulwaree Local Environmental Plan 2012* (GMLEP) (GMC 2009) (**FIGURE 3**).

[1] Land zoning map – sheet LZN_004C



SOURCE: Google Maps

SCALE: 1 : 40 000 @ A3

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Mountain Ash Road, Gundary NSW
Goulburn Mulwaree Council LGA

FIGURE 1

PREPARED: BW
DATE: 16 May 2022
FILE: N21007_Locality.cdr

TITLE

LOCALITY PLAN

N

LEGEND

- Subject Site
- Gundary Travelling Stock Reserve

Scale 1:12 500 - Lengths in metres

100 0 100 200 300 400 500

SOURCE: MetroMap Aerial dated 15/04/21; NSW LLS - Travelling Stock Reserves - State Classification Map accessed 20/05/22

SCALE: 1 : 12 500 @ A3

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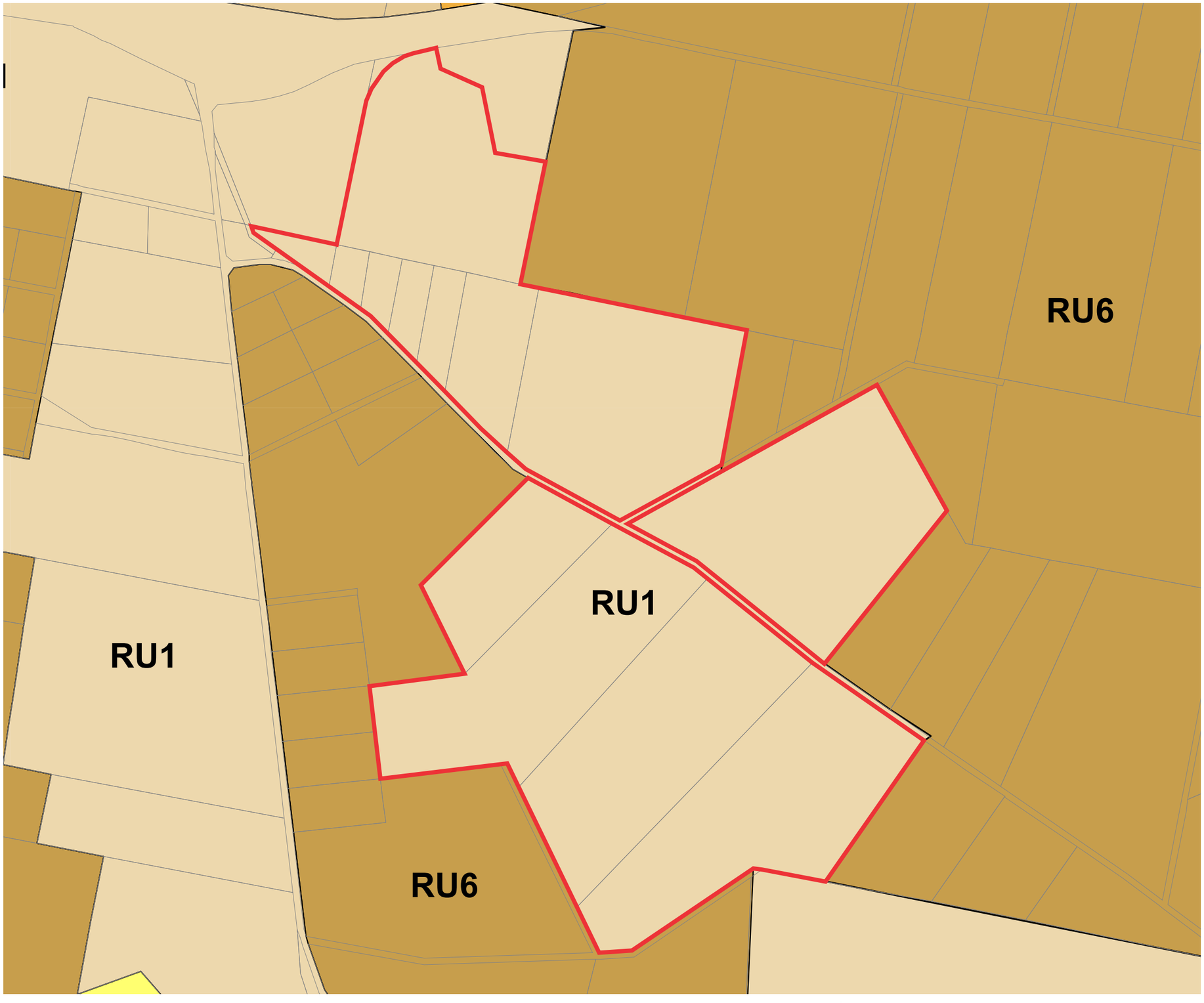
FIGURE 2

PREPARED: BW
DATE: 20 May 2022
FILE: N21007_EA_20220517.dwg

TITLE

AERIAL PHOTOGRAPH



LEGEND

Subject Site

Goulburn Mulwaree LEP 2009

- E2 - Environmental Conservation
- RE1 - Public Recreation
- RU1 - Primary Production
- RU2 - Rural Landscape
- RU6 - Transition
- SP2 - Infrastructure (Airport)

0 500m

1 : 12 500

SOURCE: Goulburn Mulwaree LEP 2009
Land Zoning Map LZN_001

SCALE: 1 : 12 500 @ A3

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FIGURE 3

PREPARED: BW
DATE: 16 May 2022
FILE: N21007_Zoning.cdr

TITLE

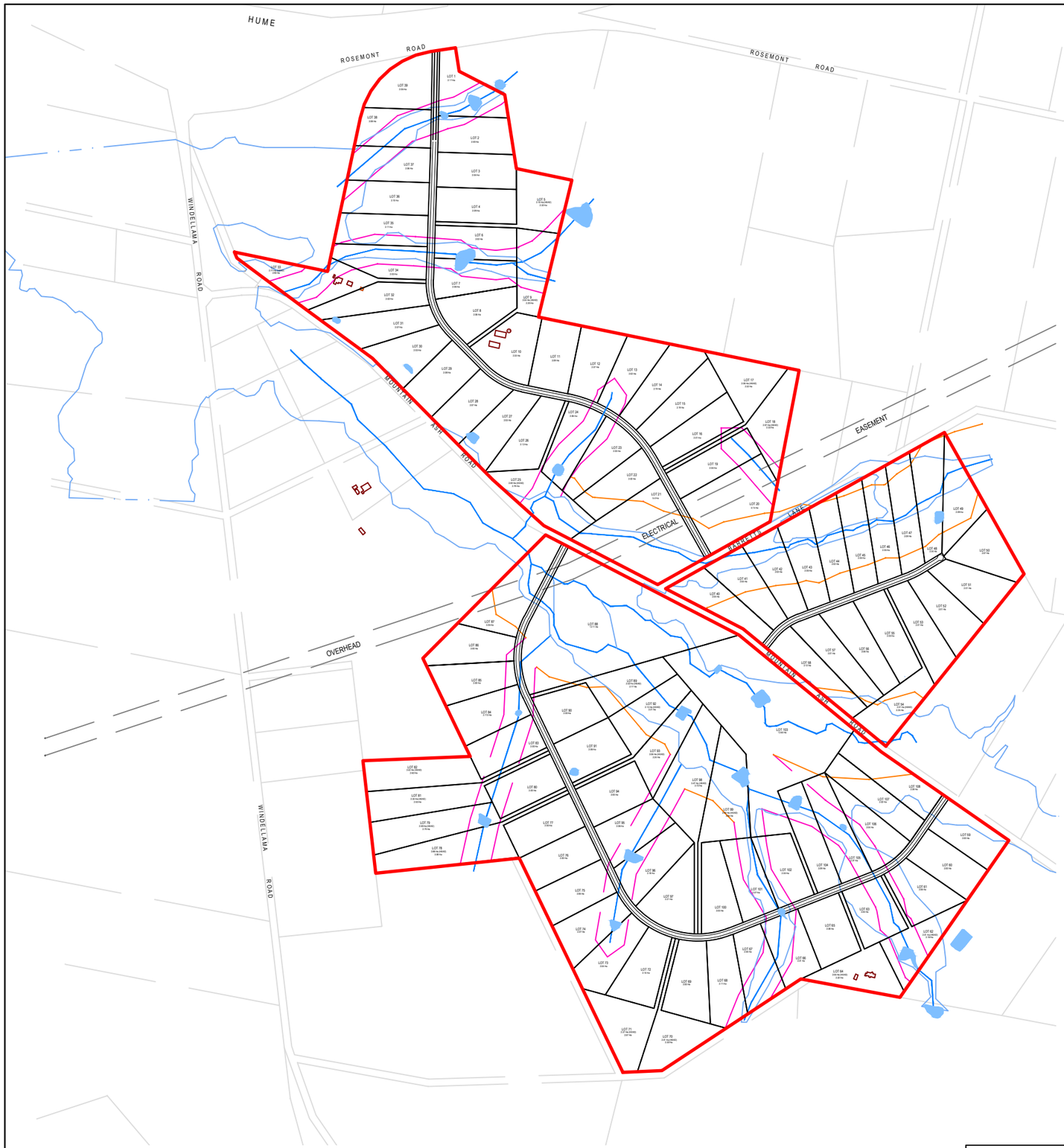
ZONING MAP

PHOTO PLATE 1
MANAGED EXOTIC/PASTURE GRASSLANDS UTILISED FOR GRAZING / AGRICULTURAL PUPROSES.

PHOTO PLATE 2
EXOTIC/PASTURE GRASSES ACROSS AN UNDULATING LANDSCAPE.

1.4 The proposed development

It is understood that the landowner is proposing to lodge a planning proposal to rezone the land to allow for a rural residential subdivision of the subject site. The current preliminary development layout includes 108 lots that facilitate rural residential allotments and associated services and access, and environmental protection / open space areas (**FIGURE 4**).



LEGEND

- Subject Site
- Cadastre Boundary

Proposed Development Layout

- Lot Boundary
- 100 Year ARI
- Watercourse / Dam
- Watercourse 40m Setback
- Watercourse 100m Setback

Scale 1:12 500 - Lengths in metres

100 0 100 200 300 400 500

SOURCE: Stuart Design (Ref: WINDELLAMA LOT LAYOUT 2022-05-16 _SD 2HA LOTS-A1 WD01 Tital & Site Plan.pdf)

SCALE: 1 : 12 500 @ A3

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FIGURE 4

PREPARED: BW
DATE: 17 May 2022
FILE: N21007_EA_20220517.dwg

TITLE
PROPOSED DEVELOPMENT LAYOUT

2 DESKTOP ASSESSMENT

2.1 Introduction

A desktop assessment was completed to highlight any potential conservation significant vegetation communities, habitat for threatened flora and fauna, and ecologically sensitive areas on the subject site. The desktop assessment included a review of:

- State and commonwealth databases;
- Commonwealth legislation;
- NSW plans, policies and legislation;
- TSC plans and policies; and
- Scientific journal articles and botanical literature to assist with habitat suitability assessments.

2.2 Methods

2.2.1 Commonwealth database searches

The Protected Matters Search Tool (PMST) was used to generate a list of the following Matters of National Environmental Significance (MNES) protected under the Commonwealth *Environment Protection Biodiversity and Conservation Act 1999* (EPBC Act) that may occur within 5 km of the subject site:

- world heritage and national heritage areas;
- wetlands of international significance (Ramsar Wetlands);
- Commonwealth marine areas;
- threatened ecological communities;
- threatened species; and
- migratory species.

The PMST database incorporates information from a range of sources, including government agencies, research, and community organisations. It should be noted that there are limitations on the accuracy of some matters reported by the PMST. Database records of threatened and migratory species are based on their current known distribution and do not necessarily correlate to an actual observation. As a result, these records are an indicator of potential presence only and do not consider if suitable vegetation, geology, soil, climate, or habitat types are present to support the occurrence of a species or community.

2.2.2 State database searches

The NSW Department of Planning, Industry and Environment (DoPIE) BioNet online database is based on collated biodiversity data acquired by the NSW Government through a range of sources including specimen collections, research and monitoring programs, and community wildlife groups. A BioNet database search was used to generate a list of threatened flora

and fauna species listed under the NSW *Biodiversity Conservation Act* 2016 (BC Act) that may occur within 10 km of the subject site.

2.2.3 Other sources

2.2.3.1 Atlas of Living Australia (ALA)

The ALA is a collaborative, digital, open infrastructure that pulls together Australian biodiversity data from multiple sources. Although scientific validation of records is not always certain, the ALA can provide a conservative database search effort in addition to BioNet. An ALA database search was used to generate a list of flora and fauna species recorded within 10 km of the subject site.

2.2.3.2 eBird

Although scientific validation of records is not always certain, the eBird database provides an additional conservative search for avifauna. A list of bird species for the Goulburn-Mulwaree LGA was generated using the eBird sightings database.

2.2.4 State government mapping

2.2.4.1 Background

The following environmental legislation and mapping was reviewed as part of the desktop assessment:

- *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP);
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity and Conservation SEPP);
- Biodiversity Values Map (BV Map); and
- Native Vegetation Regulatory Map (NVR Map);
- Fisheries NSW Spatial Data Portal; and
- Sharing and Enabling Environmental Data (SEED) mapping.

2.2.4.2 Biodiversity and Conservation SEPP

The Biodiversity and Conservation SEPP commenced on 1st March 2022. For the purposes of this EA, the following three (3) chapters in the Biodiversity and Conservation SEPP are relevant:

- Chapter 2 – Vegetation in Non-Rural Areas contains planning rules and controls relating to the clearing of native vegetation in NSW on land zoned for urban and environmental purposes that is not linked to a development application. The policy works together with the BC Act and the *Local Land Services Amendment Act 2016* to create a framework for the regulation of clearing of native vegetation in NSW. It aims to ensure the biodiversity offset scheme (established under the Land Management and Biodiversity reforms) will apply to all clearing of native vegetation

that exceeds the offset thresholds in urban areas and environmental conservation zones that does not require development consent.

- Chapter 3 – Koala Habitat Protection 2020 contains land-use planning and assessment framework for koala habitat within the rural zones of RU1, RU2 and RU3, except within the Greater Sydney and Central Coast areas.
- Chapter 4 – Koala Habitat Protection 2021 contains the land-use planning and assessment framework for koala habitat within Metropolitan Sydney and the Central Coast and applies to all zones except RU1, RU2 and RU3 in the short term.

2.2.4.3 Biodiversity Values Map (BV Map)

The BV Map identifies land with high biodiversity value, as defined by clause 7.3(3) of the *Biodiversity Conservation Regulation 2017* (BCR). The Biodiversity Offsets Scheme (BOS) applies to all clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the BCR (i.e. all local developments, major projects or the clearing of native vegetation where Chapter 2 – Vegetation in Non-Rural Areas of the Biodiversity and Conservation SEPP applies) on land identified on the map.

2.2.4.4 Native Vegetation Regulatory Map (NVR Map)

The NVR Map was prepared by the NSW Office of Environment and Heritage (OEH) under Part 5A of the amended *Local Land Services Act 2013* (LLS Act) and supporting regulation. The NVR Map generally covers rural land in NSW. It categorises land where management of native vegetation can occur without approval or where management of native vegetation may be carried out in accordance with Part 5A of the LLS Act.

2.2.4.1 Fisheries spatial data portal

The NSW Fisheries Management Act 1994 (FM Act) aims 'to conserve, develop and share the fishery resources of the state for the benefit of present and future generations and, in particular to:

- conserve fish stocks and key fish habitats, and
- conserve threatened species, populations and ecological communities of fish and marine vegetation, and
- promote ecologically sustainable development, including the conservation of biological diversity, and, consistently with those objects:
    - promote viable commercial fishing and aquaculture industries, and
    - promote quality recreational fishing opportunities, and
    - appropriately share fisheries resources between the users of those resources, and
    - provide social and economic benefits for the wider community of NSW.

To meet these objectives, and in relation to this assessment, Part 7 and Part 7A outlines legislative provisions to protect aquatic habitats and threatened species conservation.

2.2.4.2 Sharing and Enabling Environmental Data (SEED) mapping

SEED is an initiative of the NSW Government in response to community requests for reliable and readily accessible information about the environment. It was developed in collaboration with over 50 end-user groups, who advised that a unique and technically innovative approach was needed to improve access and use environmental data. SEED is a web-based portal where the community and government come to access, interrogate, contribute, and share NSW environmental data.

2.2.5 Local government plans and mapping

The GMLEP was made under the *Environmental Planning and Assessment Act 1979*, and among other things, aims to achieve the following:

- *to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts;*
- *to promote and co-ordinate the orderly and economic use and development of land in the area;*
- *to provide a framework for the Council to carry out its responsibility for environmental planning provisions and facilitate the achievement of the objectives of this Plan;*
- *to encourage the sustainable management, development and conservation of natural resources;*
- *to promote the use of rural resources for agriculture and primary production and related processing service and value adding industries;*
- *to protect and conserve the environmental and cultural heritage of Goulburn Mulwaree,*
- *to enhance and provide a range of housing opportunities in, and the residential and service functions of, the main towns and villages in Goulburn Mulwaree;*
- *to establish a framework for the timing and staging of development on certain land in Goulburn and Marulan;*
- *to provide a range of housing opportunities, including large lot residential development in the vicinity of the villages;*
- *to allow development only if it occurs in a manner that minimises risks due to environmental hazards, and minimises risks to important elements of the physical environment, including water quality;*
- *to provide direction and guidance as to the manner in which growth and change are to be managed in Goulburn Mulwaree; and*
- *to protect and enhance watercourses, riparian habitats, wetlands and water quality within the Goulburn Mulwaree and Sydney drinking water catchments so as to enable the achievement of the water quality objectives.*

Relevant environment constraints are mapped for the GMLEP under the NSW planning portal and native vegetation regulatory map.

2.3 Results

2.3.1 Database searches

2.3.1.1 Threatened ecological communities (TECs)

Database searches using the Commonwealth PMST revealed that two TECs may occur within 10 km of the subject site:

- Natural temperate grassland of the south eastern highlands (NTG-SEH) – critically endangered; and
- White box-yellow box-Blakely's red gum grassy woodland and derived native grassland – critically endangered.

2.3.1.2 Threatened flora species

Database searches identified 18 threatened species that may occur within 10 km of the subject site. These included 18 species identified using the Commonwealth PMST based on the availability of suitable habitats, of which three (3) species were identified using the BioNet database. A compiled species list is provided in **TABLE 1.**

TABLE 1
RECORDS OF LISTED THREATENED FLORA SPECIES WITHIN 10 KM OF THE SUBJECT SITE

Scientific Name	Common Name	EPBC Act	BC Act
Acacia bynoeana	Bynoe's wattle	V	E
Calotis glandulosa	Mauve burr-daisy	V	V
Commersonia prostrata	Dwarf kerrawang	E	E
Diuris aequalis	Buttercup doubletail	E	E
Dodonaea procumbens	Trailing hop-bush	V	V
Eucalyptus aggregata	Black gum	V	V
Lepidium aschersonii	Spiny pepper-cress	V	V
Lepidium hyssopifolium	Basalt pepper-cress	E	E
Leucochrysum albicans subsp. tricolor	Hoary sunray	E	-
Pomaderris cotoneaster	Cotoneaster pomaderris	E	E
Pomaderris delicata	Delicate pomaderris	CE	CE
Pomaderris pallida	Pale pomaderris	V	V
Prasophyllum petilum	Tarengo leek orchid	E	E
Rhizanthella slateri	Eastern underground orchid	E	V
Rutidosis leptorhynchoides	Button wrinklewort	E	E
Senecio macrocarpus	Large-fruit fireweed	V	-
Swainsona recta	Small purple-pea	E	E
Thesium australe	Austral toadflax	V	V

Notes:
EPBC Act - Commonwealth *Environment Protection Biodiversity and Conservation Act 1999*
BC Act – New South Wales *Biodiversity Conservation Act 2016*
Conservation status: CE - Critically endangered; E – Endangered; V – Vulnerable; NT – Near threatened

2.3.1.3 Threatened fauna species

Database searches identified 30 threatened species that may occur within 10 km of the subject site. These included 24 species identified using the Commonwealth PMST based on the availability of suitable habitats, and 11 species recorded using the BioNet database. The latter includes six (6) species otherwise not identified using the PMST.

A compiled species list from both database searches is provided in **TABLE 2.** Species that rely heavily on large permanent waterbodies and will clearly not occur on the subject site have been omitted e.g. Macquarie perch (*Macquarie australasica*).

TABLE 2
RECORDS OF LISTED THREATENED FAUNA SPECIES WITHIN 10 KM OF THE SUBJECT SITE

Scientific Name	Common Name	EPBC Act	BC Act
Amphibians			
Litoria aurea	Green and gold bell frog	V	E
Birds			
Anthochaera phrygia	Regent honeyeater	CE	CE
Botaurus poiciloptilus	Australasian bittern	E	E
Callocephalon fimbiatum	Gang-gang cockatoo	E	V
Calidris ferruginea	Curlew sandpiper	CE	E
Daphoenositta chrysoptera	Varied sittella	V	V
Falco hypoleucos	Grey falcon	V	E
Grantiella picta	Painted honeyeater	V	V
Hieraaetus morphnoides	Little eagle	-	V
Hirundapus caudacutus	White-throated needletail	V	-
Lathamus discolor	Swift parrot	CE	E
Numenius madagascariensis	Eastern curlew	CE	-
Petroica boodang	Scarlet robin	-	V
Polytelis swainsonii	Superb parrot	V	V
Pycnoptilus floccosus	Pilotbird	V	-
Rostratula australis	Australian painted snipe	E	E
Insects			
Keyacris scurra	Key's matchstick grasshopper	-	E
Synemon plana	Golden sun moth	V	E
Mammals			
Chalinolobus dwyeri	Large-eared pied bat	V	V
Dasyurus maculatus	Spotted-tail quoll	E	V
Micronomus norfolkensis	Eastern coastal free-tailed bat	-	V
Miniopterus australis	Little bent-winged bat	-	V
Petauroides volans	Greater glider	V	-
Petaurus australis	Yellow-bellied glider	V	V
Petrogale penicillata	Brush-tailed rock wallaby	V	E
Phascolarctos cinereus	Koala	V	E
Pseudomys novaehollandiae	New Holland mouse	V	-
Pteropus poliocephalus	Grey-headed flying-fox	V	V
Reptiles			

Scientific Name	Common Name	EPBC Act	BC Act
Amphibians			
Litoria aurea	Green and gold bell frog	V	E
Birds			
Aprasia parapulchella	Pink-tailed worm-lizard	V	V
Delma impar	Striped legless lizard	V	V

Notes:

EPBC Act - Commonwealth *Environment Protection Biodiversity and Conservation Act 1999*

BC Act – New South Wales *Biodiversity Conservation Act 2016*

Conservation status: CE - Critically endangered; E – Endangered; V – Vulnerable; NT – Near threatened

2.3.1.4 Migratory species

Database searches using the Commonwealth PMST identified 12 migratory species that may occur within 10 km of the subject site based on the availability of suitable habitat. Migratory species identified in database searches are listed in **TABLE 3**. Species that are heavily reliant on marine / large wetland environments and will clearly not occur on the subject site have been omitted.

TABLE 3
RECORDS OF LISTED MIGRATORY SPECIES WITHIN 10 KM OF THE SUBJECT SITE

Scientific Name	Common Name
Apus pacificus	Fork-tailed swift
Adrea alba	Great egret
Ardea ibis	Cattle egret
Haliaeetus leucogaster	White-bellied sea-eagle
Hirundapus caudacutus	White-throated needletail
Lathamus discolor	Swift parrot
Merops ornatus	Rainbow bee-eater
Monarcha melanopsis	Black-faced monarch
Motacilla flava	Yellow wagtail
Myiagra cyanoleuca	Satin flycatcher
Pandion haliaetus	Osprey
Rhipidura rufifrons	Rufous fantail

2.3.1.5 Other sources

Interrogation of the ALA and eBird identified the following seven (7) threatened species that may occur within the locality but were otherwise not identified in the PMST or BioNet database (**TABLE 4**).

TABLE 4
RECORDS OF LISTED THREATENED SPECIES IDENTIFIED USING ATALAS OF LIVING AUSTRALIA AND EBIRD DATABASES

Scientific Name	Common Name	EPBC Act	BC Act
Calidris acuminata	Sharp-tailed sandpiper	M	-
Calyptorhynchus lathami	Glossy black-cockatoo	-	V
Falco subniger	Black falcon	-	V
Falsistrellus tasmaniensis	Eastern false pipistrelle	-	V
Gallinago hardwickii	Latham's snipe	M	-
Nyctophilus corbeni	Corben's long-eared bat	V	V
Saccolaimus flaviventris	Yellow-bellied sheathtail-bat	-	V
Notes: Conservation status: V – Vulnerable; M - Migratory			

2.3.2 State government mapping

2.3.2.1 Biodiversity and Conservation SEPP

The subject site is zoned as RU1 – Primary Production Rural under the GMLEP (**FIGURE 3**). As a result, Chapter 3 – Koala habitat protection 2020 applies. This is further discussed in **SECTION 8.4**.

Chapter 2 – Vegetation in Non-Rural Areas does not apply.

2.3.2.2 Biodiversity Values Map (BV Map)

The site is not mapped on the Biodiversity Values Map.

2.3.2.3 Native Vegetation Regulatory Map (NVR Map)

The site is not mapped as containing regulated land on the NVR Map.

2.3.2.4 Sharing and Enabling Environmental Data (SEED) mapping

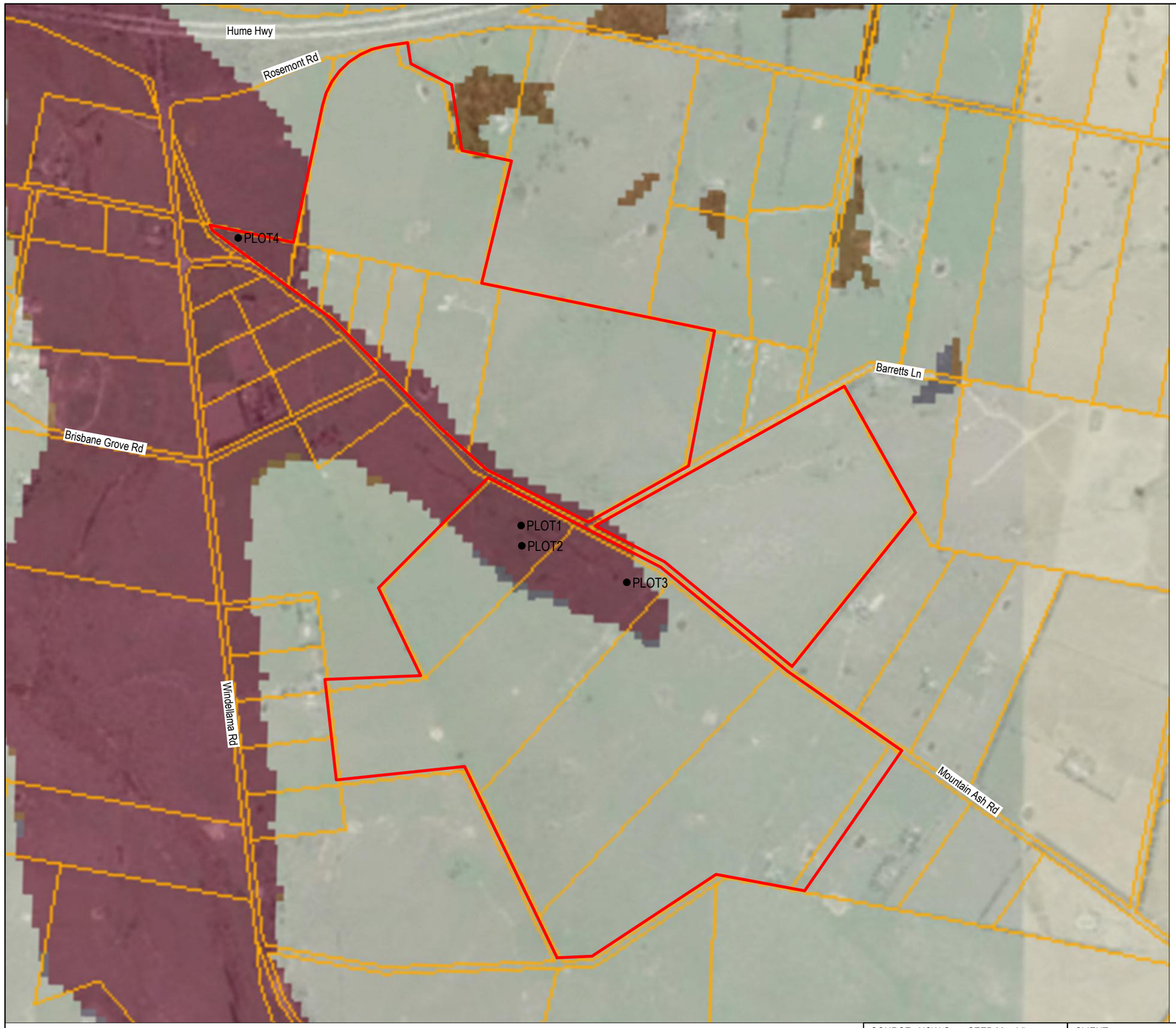
The subject site is mapped are containing small areas of the following on the southeast NSW native vegetation map (SouthCoast_SCIVI_v14_E_2230) (**FIGURE 5**):

- Tableland Flats Grassland;
- Tablelands Grassy Box-Gum Woodland; and
- Tableland Swamp Flats Forest.

The Tableland Flats Grassland is potentially representative of *Natural temperate grassland of the south eastern highlands* (NTG-SEH) - which is listed as a Critically Endangered Ecological Community (CEEC) within schedules of the EPBC Act.

The Tablelands Grassy Box-Gum Woodland is potentially representative of:

i. *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* – which is listed as CEEC within schedules of the EPBC Act; and



LEGEND

- Subject Site
- Survey Plot

Southeast NSW Native Vegetation Mapping

- Tableland Flats Grassland
- Tableland Grassy Box-Gum Woodland
- Tableland Swamp Flats Forest

N

Scale 1:12 500 - Lengths in metres

100 0 100 200 300 400 500

SOURCE: NSW Govt. SEED Map Viewer - Southeast NSW Native Vegetation Mapping (SouthCoast_SCIVI_v14_E_2230)

SCALE: 1 : 12 500 @ A3

JWA PTY LTD
Ecological Consultants

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PROJECT
Ecological Assessment
Mountain Ash Road, Gundary NSW
Goulburn Mulwaree Council LGA

FIGURE 5

PREPARED: BW
DATE: 17 May 2022
FILE: N21007_EA_20220517.dwg

TITLE
SOUTHEAST NSW NATIVE VEGETATION MAPPING

ii. *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* – which is listed as Critically Endangered within schedules of the BC Act.

2.3.2.5 Fisheries spatial data portal

The subject site contains two (2) main drainage lines that are mapped as 'Key Fish Habitat' under the FM Act (**FIGURE 6**).

2.3.3 Local government plans and mapping

The subject site is zoned as Primary Production (RU1) under the GMLEP (**FIGURE 3**). Parts of the subject site are mapped as Terrestrial Biodiversity – Biodiversity under the GMLEP (**FIGURE 7**).

LEGEND

- Key Fish Habitat
- Subject Site

N

Scale 1:12 500 - Lengths in metres

100 0 100 200 300 400 500

SOURCE: NSW DPI Fisheries NSW Spatial Data Portal - Key Fish Habitat - Hawkesbury Nepean (accessed 17/05/22)

SCALE: 1 : 12 500 @ A3

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CLIENT
Windellama Road Pty Ltd & GTSMF Pty Ltd

PROJECT
Ecological Assessment
Mountain Ash Road, Gundary NSW
Goulburn Mulwaree Council LGA

FIGURE 6

PREPARED: BW
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FILE: N21007_EA_20220517.dwg

TITLE

KEY
FISH
HABITAT

Hume Hwy
Rosemont Rd
Barretts Ln
Brisbane Grove Rd
Windellama Rd
Mountain Ash Rd

N

LEGEND

Subject Site

Goulburn Mulwaree LEP 2009

Biodiversity

Scale 1:12 500 - Lengths in metres

100 0 100 200 300 400 500

SOURCE: Goulburn Mulwaree LEP 2009
Terrestrial Biodiversity Map BIO_001

SCALE: 1 : 12 500 @ A3

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FIGURE 7

PREPARED: BW
DATE: 17 May 2022
FILE: N21007_EA_20220517.dwg

TITLE

GWLEP
TERRESTRIAL
BIODIVERSITY MAP

3 TARGETED FLORA ASSESSMENT

3.1 Introduction

This section discusses the methods used in the vegetation assessment and presents the results of the assessment.

A desktop assessment was completed to highlight any potential conservation significant vegetation communities, any potential habitat for threatened flora and fauna, and any ecologically sensitive areas on the site. The methods and results of the desktop assessment are discussed in **SECTION 2.**

Subsequently, a vegetation survey was completed by two JWA ecologists between the 21st – 25th February 2022 in conjunction with general and targeted fauna surveys. A total of approximately 44 person hours were spent on this component of the survey. This section includes a discussion of the methods, results, and outcomes of the targeted flora assessment.

3.2 Methods

3.2.1 General vegetation surveys

Preliminary identification of vegetation communities was completed during the ECA and via interpretation of aerial photographs prior to field surveys. Preliminary vegetation community mapping identified specific areas for targeted vegetation surveys of TECs (**SECTION 3.2.2**).

A flora species list was compiled for the subject site during the vegetation surveys (**APPENDIX 1**).

3.2.2 Targeted vegetation surveys

3.2.2.1 Threatened flora

The random meander technique (Cropper 1993) was used to search the subject site for the threatened flora during the general and targeted surveys.

3.2.2.2 Natural temperate grasslands

Background

To determine the presence of any potential natural temperate grassland TEC, assessments were undertaken within areas of the site mapped as Tableland Flats Grassland on the SEED mapping (**FIGURE 5**) and centred on any area identified as comprising the highest native floristic diversity as set out in the *Approved conservation advice for the NTG-SEH ecological community* (DAWE 2016).

It is noted that the species composition of NTG-SEH ecological community at any one time is influenced by the season of the year, previous or current rainfall or drought conditions and by the prior or on-going disturbances occurring at the site (Sharp 2006, Environment

ACT 2005, Prober *et. al.* 2009). Whilst identifying the ecological community and its condition is possible at most times of the year, consideration must be given to the role that season and disturbance history may play in an assessment, as it is recognised that the structure and composition of the ecological community can vary between seasons and between years (DAWE 2016). With consideration of the above, applicable condition thresholds within the Approved conservation advice for the NTG-SEH ecological community (DAWE 2016) provide differing requirement dependent upon whether sampling is completed during favourable sampling times i.e. in spring to early summer, and/or other time when native plant species are most evident (e.g. significant recent rainfall that has stimulated flowering of native plants) or when sampling is completed during other sampling times.

Sampling methods & timing

Following the sampling protocols in DAWE 2016, and with consideration of the SEED mapping (**SECTION 2.3.2.4**), four 20 m x 20 m (400 m^2) plots identified as containing the most likely highest native floristic diversity, were assessed across the subject site (**FIGURE 5**).

To determine the validity of any potential NTG-SEH TEC, each plot was sampled by two (2) senior ecologists to record the vegetation cover and species diversity to apply the relevant key diagnostic characteristics and condition thresholds. Although sampling was completed in late summer (i.e. February), the surveys followed significant rainfall in the Goulburn area and observation of known NTG-SEH TEC in the surrounding landscape (i.e. Gundary Travelling Stock Route) confirmed that numerous native forbs were flowering at the time (**PHOTO PLATES 3 - 4**). Survey timing was therefore considered to be suitable, however plot results were compared against both the favourable sampling times and the other sampling times condition thresholds.

The location of each plot was recorded using a handheld GPS unit and digital photographs were taken to illustrate the general structure and condition. To provide additional context with the grassland vegetation observed on the subject site, known NTG-SEH TECs were inspected in the surrounding landscape. Digital photographs were taken for comparative purposes.

3.2.2.3 Box-gum woodlands and grasslands

All areas on the subject site containing overstorey species were investigated of foot to determine the presence of box-gum overstorey species as per the EPBC Act Policy Statement for *White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands* (DEH 2006). All suitable overstorey species were recorded using a handheld GPS unit.

To determine the validity of any potential box-gum TEC (as per DEH 2006), understorey species were assessed (i.e. native v exotic) and the apparent extent of each community was estimated (i.e. patch size). Digital photographs were taken to illustrate the general structure and condition of assessed communities.

PHOTO PLATE 3
NATIVE FORBS FLOWERING AT THE NEARBY GUNDARY TRAVELLING STOCK ROUTE DURING THE TIME OF THE SURVEYS

PHOTO PLATE 4
NATIVE FORBS FLOWERING AT THE NEARBY GUNDARY TRAVELLING STOCK ROUTE DURING THE TIME OF THE SURVEYS

To provide additional context with vegetation observed on the subject site, known box-gum woodland and grassland TECs were inspected in the surrounding landscape. Digital photographs were taken for comparative purposes.

3.3 Results

3.3.1 General flora

A total of 155 flora species were recorded at the subject site, 50% of which (i.e. 78 species) are exotic/weed species**,** however exotic/weed species are estimated to contribute greater than 95% of the sites biomass. No threatened species listed within schedules of the EPBC Act or BC Act were recorded. A full list of species recorded at the subject site is included as **APPENDIX 1**. Weed species are indicated using an asterisk*.

Most of the subject site is clear of any native vegetation and is currently grazed by sheep and comprised of fodder crops including Harding grass* (*Phalaris aquatica*), Perennial ryegrass* (*Lolium perenne*) and Cocksfoot* (*Dactylis glomerata*), or currently disused/spelled paddocks containing a mixture of exotic/pasture grasses and common agricultural weeds. There are very few mature trees or shrubs, and most native flora species are comprised of scattered grasses, sedges, rushes and forbs amongst exotic/pasture grasses within lower-lying areas of the site.

3.3.2 Threatened flora

No threatened flora species was recorded during the field assessment. A discussion on the habitat suitability and likely occurrence of each species known or predicted to occur within 10km of the subject (**SECTION 2.3.1.2**) site is provided in **SECTION 5.2.1**.

3.3.3 Vegetation Zones (VZs)

3.3.3.1 Background

A total of three (3) Vegetation Zones (VZ) were identified on the subject site based on different broad condition states (**TABLE 5**). In addition, numerous farm dams have been constructed throughout the site, but generally contain minimal fringing native vegetation.

TABLE 5
VEGETATION COMMUNITIES PRESENT ON THE SUBJECT SITE

Vegetation Zone (VZ)	Brief Description
VZ1	Blakely's red gum woodland (*Eucalyptus blakelyi*) (derived - PCT 1330)
VZ2	Exotic/pasture grasses +/- native grasses, sedges, rushes, forbs
VZ3	Cleared land/pasture grasses

3.3.3.2 Vegetation zone descriptions

The following section describes the vegetation zones occurring on the subject site and the applicable Plant Community Type (PCT) as described by the NSW BioNet Vegetation Classification System where relevant.

Vegetation Zone 1 (VZ1) - Blakely's red gum woodland (*Eucalyptus blakelyi*)

Location

A small patch of this vegetation zone occurs immediately adjacent to Lot 1 on DP853498 and extends slightly into the far northern extent of the subject site (**FIGURE 8**). A number of other patches of this VZ were identified on a property to the immediate east of the subject site. This vegetation zone covers a total area of approximately 0.38 ha (3,792 m^2) on the subject site.

Description

This vegetation zone on the subject site is essentially comprised of a total of seven (7) scattered mature Blakely's red gum (*E. blakelyi*) up to approximately 15 m in height (**PHOTO PLATES 5 - 6**).

The midstorey within this vegetation zone is generally absent except for clumps of African boxthorn* (*Lycium ferocissmum*) usually associated with the bases of scattered overstorey trees (**PHOTO PLATE 5**).

The groundcover component was generally dominated by weeds/exotic pasture grasses (**PHOTO PLATE 6**), including (as examples) African lovegrass* (*Eragostis curvula*), Cocksfoot*, Ryegrass (*Lolium spp.*), *Paspalum dilatatum.* Some scattered native grasses and forbs were also present including (as examples) Common couch (*Cynodon dactylon*), Windmill grass (*Chloris truncata*), Red grass (*Bothriochloa macra*), and Common wheat grass (*Anthosachne scabra*).

Conservation status

VZ1 is considered likely to be derived from Plant Community Type (PCT) 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion.

PCT 1330 is known to be representative of the TEC *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* – which is listed as Critically Endangered within schedules of the EPBC Act. However, an assessment of this VZ against the relevant condition thresholds set out in the National Recovery Plan (DECCW 2010) (refer **SECTION 3.3.4.2**) has determined that VZ1 is not representative of this TEC.

Furthermore, PCT 1330 is known to be representative of the *White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* – which is listed as Critically Endangered within schedules of the BC Act. VZ1 is considered to have been severely compromised by past clearing activities and subsequent invasion by

Hume Hwy
Rosemont Rd
Barretts Ln
Brisbane Grove Rd
Windellama Rd
Mountain Ash Rd

N

LEGEND

- Subject Site
- Surveyed Native Overstorey Trees

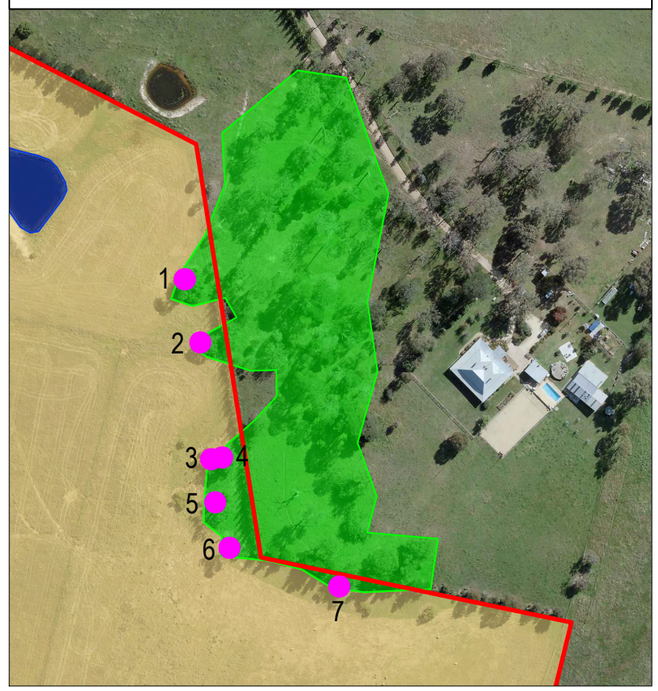
Vegetation Communities

- VZ1 - Blakely's red gum woodland (*Eucalyptus blakelyi*) (derived - PCT 1330)
- VZ2 - Exotic/pasture grasses +/- native grasses, sedges, rushes, forbs
- VZ3 - Cleared land/pasture grasses
- Dams

INSET - VZ1 TREE SURVEY

Inset Scale 1:3000 - Lengths in metres

50 0 50 100 150



Scale 1:12 500 - Lengths in metres

100 0 100 200 300 400 500

SOURCE: JWA Site Investigations; MetroMap Aerial dated 15/04/21

SCALE: 1 : 12 500 @ A3

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FIGURE 8

PREPARED: BW
DATE: 17 May 2022
FILE: N21007_EA_20220517.dwg

TITLE

VEGETATION COMMUNITIES

PHOTO PLATE 5
ISOLATED BLAKELYS RED GUM (*EUCALYPTUS BLAKELYI*) ON THE SUBJECT ISTE WITH AFRICAN BOXTHORN (*LYCIUM FEROCISSMUM)* SURROUNDING THE BASE.

PHOTO PLATE 6
ISOLATED BLAKELYS RED GUM (*EUCALYPTUS BLAKELYI*) ON THE SUBJECT SITE WITH WEED/EXOTIC PASTURE GRASSES.

numerous weeds/exotic pasture grass species. Regardless, as a precautionary approach, VZ1 has been treated as a degraded patch of this CEEC for the purposes of the BC Act (refer **SECTION 3.3.5**).

Vegetation Zone 2 (VZ2) - Exotic/pasture grasses +/- native grasses, sedges, rushes, forbs

Location

This vegetation zone occurs throughout the southern portion of the site (**FIGURE 8**) in association with waterways/drainage lines and low-lying areas and covers a total area of approximately 7.57 ha.

Description

This community is essentially comprised of low-lying areas dominated by a mixture of exotic/pasture grasses, including (as examples) African lovegrass, Serrated tussock* (*Nassella trichotoma*), Harding grass*, Pale pigeon grass* (*Setaria pumila*), Wimmera ryegrass (*Loliul rigidum*), Tall fescue (*Festuca arundinacea*), and *Paspalum dilatatum.*

There are also scattered native grasses, sedges, rushes, and forbs including Speargrass (*Austrostipa scabra*), Red grass, Common wheat grass, Windmill grass, Common couch, Tussock (*Poa labillardierei var. labillardierei*), Tall sedge (*Carex appressa*), *Eleocharis acuta* and Fluke bogrush (*Schoenus apogon*) (**PHOTO PLATES 7 - 8**).

Within the watercourses/drainage lines and associated areas of standing water, some dense stands of Narrow-leaved cumbungi (*Typha domingensis*) occur as well as scattered Creeping knotweed (*Persicaria prostrata*), *Eleocharis acuta, Lepidosperma gunnii* and *Juncus usitatus.*

Conservation status

Due to a long history of vegetation modification/disturbance in this area of the subject site, VZ2 is not considered to be representative, or to have been derived from, any PCT as described by the NSW BioNet Vegetation Classification System.

Native grasslands in the region (even in a disturbed state) can be representative of the NTG-SEH TEC which is listed as Critically Endangered within schedules of the EPBC Act. However, an assessment of this VZ against the relevant key diagnostic characteristics and condition thresholds included within the Approved Conservation Advice for the NTG-SEH TEC (DAWE 2016) has been completed in **SECTION 3.3.4.1** (see **APPENDIX 2** for raw plot data), and this assessment has determined that VZ2 is not representative of this TEC.

The conservation status of this vegetation community is considered to be low.

PHOTO PLATE 7
EXOTIC/PASTURE GRASSES WITH NATIVE SEDGES IN THE LOWER-LYING WATERCOURSE / DRAINAGE LINE.

PHOTO PLATE 8
LARGE DAM SURROUNDED BY A NARROW BAND OF NATIVE FLORA IN AREAS.

Vegetation Zone 3 (VZ3) – Cleared land/pasture grasses

Location

This vegetation zone occurs over the majority of the subject site (**FIGURE 8**) and covers a total of approx. 260 ha.

Description

The vegetation zone is cleared and is currently grazed by sheep (**PHOTO PLATES 9 - 10**), and generally comprised of fodder crops including Harding grass*, Ryegrass* (*Lolium spp.*) and Cocksfoot*. Several currently disused/spelled paddocks also occur and contain a mixture of exotic/pasture grasses and common agricultural weeds. There are some scattered patches of Blackberry* (*Rubus fruticosus* sp. agg.) and Hemlock* (*Conium maculatum*). Some planted exotic trees/gardens occur near the existing dwellings.

Conservation status

This vegetation zone is not considered to be representative, or to have been derived from, any PCT as described by the NSW BioNet Vegetation Classification System.

The conservation status of this vegetation community is considered to be low.

3.3.4 Threatened Ecological Communities (EPBC Act)

3.3.4.1 Natural temperate grassland of the south eastern highlands (NTG-SEH)

Introduction

As outlined in the Approved Conservation Advice for this TEC (DAWE 2016);

> "*national listing focuses legal protection on remaining patches that are most functional, relatively natural and in relatively good condition. Key diagnostic characteristics and condition thresholds assist in identifying a patch of the TEC, determine when the EPBC Act is likely to apply to the ecological community and to distinguish between patches of different quality.*
>
> *Condition thresholds provide guidance for when a patch of a threatened ecological community retains sufficient conservation values to be considered as a MNES. Patches that do not meet the minimum condition thresholds are excluded from full national protection. This means that the referral, assessment, and compliance provisions of the EPBC Act are focussed on the most valuable elements of the ecological community."*

The most likely representatives of this TEC on the subject site are within VZ2. Therefore, an assessment against the key diagnostic characteristics and condition thresholds included within the Approved Conservation Advice for the NTG-SEH TEC (DAWE 2016) has been completed below.

As previously discussed, applicable condition thresholds within the *Approved conservation advice for the NTG-SEH ecological community* (DAWE 2016) provide differing requirement

PHOTO PLATE 9
EXOTIC/PASTURE GRASSES

PHOTO PLATE 10
EXOTIC/PASTURE GRASSES WITH GRAZING SHEEP

dependant upon whether sampling is completed during favourable sampling times i.e. in spring to early summer, and/or other times when native plant species are most evident (e.g. significant recent rainfall that has stimulated flowering of native plants) or when sampling is completed during other sampling times. Although sampling was completed in late summer (i.e. February), the surveys followed significant rainfall in the Goulburn area and observation of known NTG-SEH TEC in the surrounding landscape (i.e. Gundary Travelling Stock Route) confirmed that numerous native forbs were flowering at the time (**PHOTO PLATES 3 - 4**). Survey timing was therefore considered to be suitable, however plot results were compared against both the favourable sampling times and the other sampling times condition thresholds.

This assessment utilised four (4) sampling plots identified as containing the highest native floristic diversity (**APPENDIX 2**), as well as general observations made while traversing the entire subject site during vegetation surveys.

Key diagnostic characteristics

In accordance with Section 1.5.1 - Step 1 of the Approved Conservation Advice, VZ2 satisfies the geographical (i.e. South Eastern Highlands) and elevation (i.e. 350–1200 m) characteristics of this TEC; however, data collected during the field assessment indicated that there are no areas across the subject site that are dominated (or even partially dominated) by native grasses or sedges. In addition, some of the key species outlined in APPENDIX A of the Approved Conservation Advice (DAWE 2016) are not present (as examples; Kangaroo grass *Themeda triandra*; Snow grass *Poa siberiana*).

Furthermore, there was no evidence collected or observed across the subject site to indicate that the key diagnostic characteristics would be satisfied over an area of 0.1 ha, considered to be the minimum patch size for consideration as part of the TEC.

Condition thresholds

The below assessment of the condition thresholds is based on Section 1.5.2 - Step 2 of the Approved Conservation Advice**.**

There are no distinct patches in VZ2 (or elsewhere on the subject site) that are characterised by at least 50% foliage cover of the ground being comprised of either kangaroo grass, River tussock grass (*Poa labillardierei*), and/or Plains sedge (*Carex bichenoviana*).

Plot data (**APPENDIX 2**) and observational data collected across the subject site did not identify distinct patches whereby the percentage covers of native vascular plants was greater than exotic species. In addition, plot data did not indicate any of the following:

During favourable sampling times (usually when most species are evident):

- At least 8 non-grass native species; OR
- At least 2 indicator species; OR
- A floristic value score of at least 5.

During other sampling times:

- At least 4 non-grass native species; OR
- At least 1 indicator species; OR
- A floristic value score of at least 3.

There are no patches on the subject that satisfy the minimum threshold for a moderate to high condition TEC.

Given the above threshold could not be met, it can be confidentially concluded that there are no distinct patches on the subject site that would satisfy the minimum thresholds for high to very high condition or excellent condition of the TEC.

Summary

With the above assessment considered, there are no distinct patches on the subject site that satisfy the relevant key diagnostic characteristics or minimum condition thresholds of the NTG-SEH ecological community to be subject to the referral, assessment, and compliance provisions of the EPBC Act.

For comparative purposes, **PHOTO PLATES 11 - 12** illustrate the difference in condition between the subject site and a known patch of the NTG-SEH (dominated by Kangaroo grass) associated with the Gundary Travelling Stock Reserve to the immediate south of the subject site (**FIGURE 2**).

3.3.4.2 White box-yellow box-Blakely's red gum grassy woodland and derived native grassland

Introduction

As outlined in the National Recovery Plan for this TEC (DECCW 2010):

> *"the EPBC Act regulates actions that may result in significant impact on this listed ecological community, such as clearing trees or understorey vegetation in or next to the community, inappropriate grazing and burning regimes, introduction of potentially invasive pasture species, firewood collection and use of chemical fertilisers in patches which increase the nutrient levels."*

VZ1 is the most likely representative of this TEC on the subject site. An assessment has been completed below. Following the relevant pathway against the condition thresholds included in *Appendix 2 Box-Gum Grassy Woodland Identification Flowchart* of the National Recovery Plan (DECCW 2010) (**FIGURE 9**), VZ1 is not considered to be the listed ecological community as, whilst Blakeley's red gum is the most common overstorey species, the small area of VZ1 does not have a predominantly native ground layer.

PHOTO PLATE 11
EXOTIC / PASTURE GRASSLAND CONSISTENT WITH THE MAJORITY OF THE SUBJECT SITE. ONGOING GRAZING IS SHOWN.

PHOTO PLATE 12
REPRESENTATIVE PATCH OF NTG-SEH ASSOCIATED WITH THE GUNDARY TRAVELLING STOCK RESERVE. KANGAROO GRASS (*THEMEDA TRIANDRA)* CAN BE SEEN AS THE DOMINANT SPECIES.

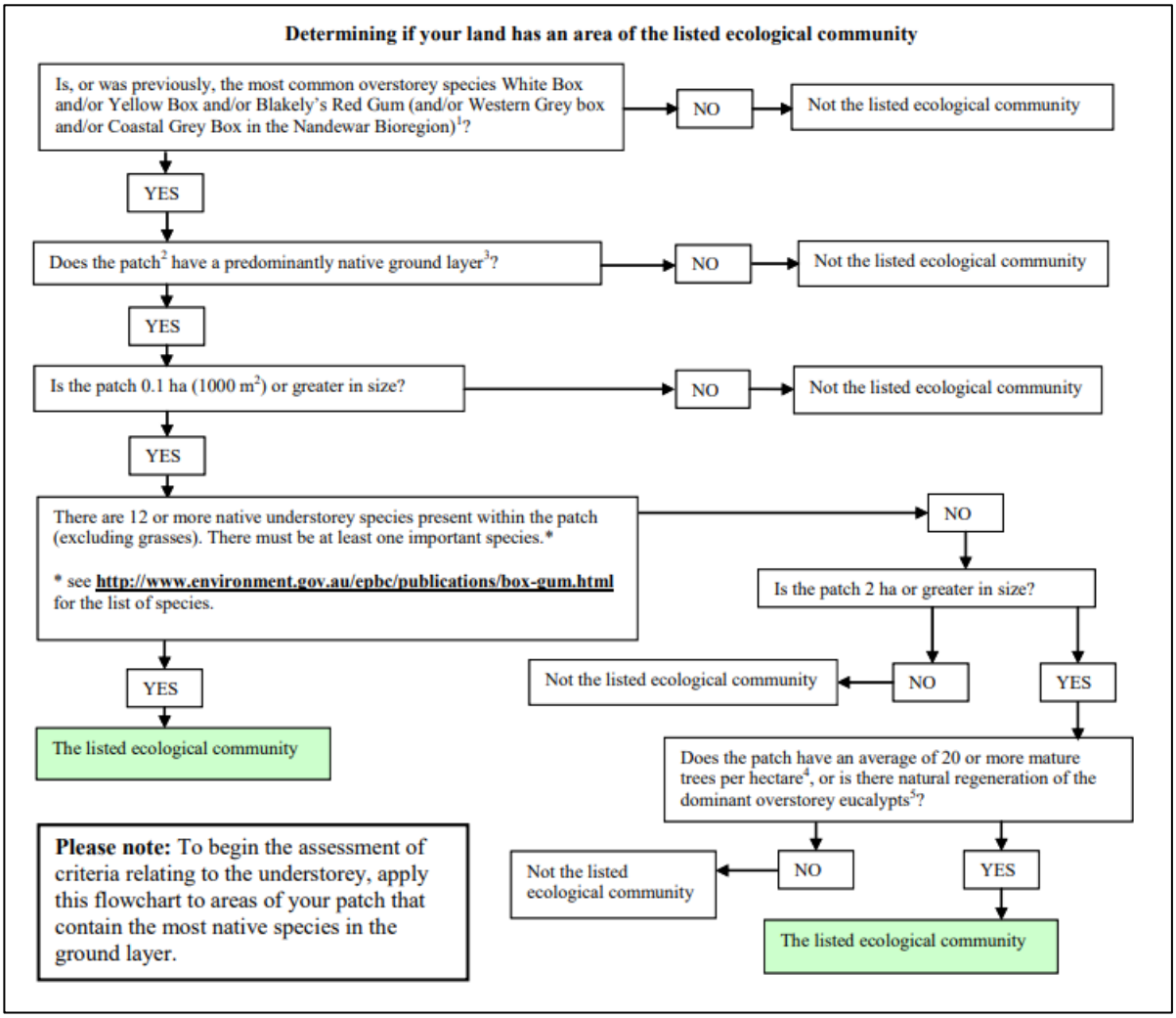


FIGURE 9. BOX-GUM GRASSY WOODLAND IDENTIFICATION FLOWCHART.

Summary

With the above assessment considered, VZ1 does not meet the minimum condition at which the patch can be included in the listed ecological community. A referral under the EPBC Act, in this case, is **not** considered necessary.

Notwithstanding this, VZ1 on the subject site and adjoining patches of this vegetation type on adjoining properties have been treated as degraded patches of this TEC. It is recommended that VZ1 where it occurs on the subject site is retained and restored through assisted natural regeneration and/or revegetation works. It is also recommended that buffer plantings are implemented to this patch and to patches that occur immediately off site. All retained and rehabilitated areas of VZ1, and associated buffer areas should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

3.3.5 Threatened Ecological Communities (BC Act)

As discussed above VZ1 on the subject site is potentially representative of the *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* listed as a Critically Endangered Ecological Community (CEEC) within schedules of the BC Act.

To determine the presence of the CEEC on the subject site, an assessment was undertaken against the list of key characteristics from the Identification guidelines for Endangered Ecological Communities: White box- Yellow box - Blakely's red gum woodland (DECC 2007). The following applies:

Key characteristic	**Relevance to the subject site**
Is the site on the tablelands or western slopes of NSW?	Yes
Does the site contain, or would the site have recently been likely to contain, White Box, Yellow Box or Blakely's Red Gum?	Yes (VZ1)
Is the ground layer mainly grassy?	Yes
If the site has been degraded, is there potential for assisted natural regeneration of the tree layer or the understorey (e.g. by removing grazing, weeds, etc)?	Yes

The requirements for recognising a Box-Gum Woodland under the BC Act differ slightly to those of the equivalent TEC listed within schedules of the EPBC Act, in that determining if an area is suitable is not determinant on the groundcover being predominately native.

Notwithstanding the above, the conservation value of VZ1 needs to be determined based on the degree of disturbance. Based on field assessments and aerial mapping interrogation, these areas are considered to have been severely compromised by past clearing activities and subsequent invasion by numerous weeds/exotic pasture grass species (see discussion of VZ1 in **SECTION 3.3.3.2**). Consequently, as a result of the above assessment, as a precautionary approach VZ1 is considered to represent an area of degraded CEEC Box-Gum Woodland.

4 TARGETED FAUNA ASSESSMENT

4.1 Introduction

This section discusses the methods used in the fauna assessment and presents the results of the assessment. A desktop assessment was completed to highlight any potential habitat for threatened fauna species. The methods and results of the desktop assessment are provided in **SECTION 2.**

Subsequently, targeted diurnal and nocturnal field surveys were undertaken by two (2) JWA ecologists between the 21st – 25th February 2022. A total of approximately 48 person hours and 24 person hours were spent on the diurnal and nocturnal components of the survey, respectively. This section includes a discussion of the methods, results, and outcomes of the targeted fauna assessment.

The weather conditions recorded at the nearby (~2 km) Goulburn Airport AWS (Station Number 070330) during the field surveys are summarised in **TABLE 6**.

TABLE 6
FIELD SURVEY WEATHER CONDITIONS

Time	Temperature (ºC)	Wind (Direction – km/hr)	Humidity (%)	Rain (mm / past 24 hrs)
21st February 2022				
9:00	19.2	Calm	84	0
15:00	28.8	Calm	38	-
Min / Max	13.5 / 29.5	SE – 67 (max)	-	-
22nd February 2022				
9:00	16.4	SSW - 2	97	15.0
15:00	27.7	Calm	54	-
Min / Max	11.5 / 30.1	ESE - 37 (max)	-	-
23rd February 2022				
9:00	13.2	E - 13	91	0.2
15:00	15.6	SE -20	75	-
Min / Max	12.4 / 18.6	SE – 35 (max)	-	-
24th February 2022				
9:00	12.4	SE - 17	80	0.2
15:00	16.9	ESE - 20	78	-
Min / Max	9.9 / 17.6	E – 31 (max)	-	-
25th February 2022				
9:00	13.7	N - 11	99	0.2
15:00	23.9	NW – 17	63	-
Min / Max	11.3 / 25.5	NW - 28 (max)	-	-

4.2 Methods

4.2.1.1 Spotlighting

At night, spotlighting was undertaken by two JWA scientists for approximately 3 hours per night for a total of 24 person hours spotlighting. Observers walked at approximately 1 km/h, allowing intensive listening as an adjunct to visual detection.

Focus was placed on ephemeral watercourses / drainage lines and dams to detect the threatened green and gold bell frog (DEWHA 2009).

Albeit limited in its extent across the subject site, spotlighting was also undertaken by traversing areas containing mid and/or upper strata vegetation.

4.2.1.2 Call playback

As per the survey guidelines for the green and gold bell frog (DEWHA 2009), nocturnal call playback sessions were completed each night for four (4) nights. Each call was broadcast through a megaphone for five-minutes at intervals along natural ephemeral watercourses / drainage lines and dams, followed by a five-minute listening period (**FIGURE 10**).

Calls of the threatened powerful owl (*Ninox strenua*) were also broadcast at several locations across the subject site.

4.2.1.3 Infrared motion detector cameras

Four (4) infrared motion detector cameras were positioned for a period of four (4) nights for a total of 16 trap nights with a primary focus on vegetated areas and ephemeral watercourses / drainage lines (**FIGURE 10**).

4.2.1.4 Microbat detection

Anabat Express Passive Bat Detectors (Titley Scientific) were placed at four (4) separate locations throughout the subject site for 3-4 nights to detect microbats (**FIGURE 10**). Units were used to record calls from between the hours of dusk (1800h) and dawn (0600h).

4.2.1.5 Active diurnal searching

The following active searches were undertaken across the subject site:

- Overturning of logs, sheets of tin, cardboard, bark and leaves in search of reptiles while traversing the subject site;
- Searches were undertaken for diggings, scats, and bones;
- Active observation of bird species, both aurally and visually; and
- Targeted searches in suitable habitat for basking green and golden bell frog (as per the best practise field survey recommendations [DEWHA 2009]).

N

LEGEND

- Subject Site

Survey Locations

- Anabat
- Call Playback
- Infrared Motion Detector Camera

Scale 1:12 500 - Lengths in metres

100 0 100 200 300 400 500

SOURCE: JWA Site Investigations; MetroMap Aerial dated 15/04/21

SCALE: 1 : 12 500 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Windellama Road Pty Ltd & GTSMF Pty Ltd

PROJECT
Ecological Assessment
Mountain Ash Road, Gundary NSW
Goulburn Mulwaree Council LGA

FIGURE 10

PREPARED: BW
DATE: 17 May 2022
FILE: N21007_EA_20220517.dwg

TITLE

SURVEY LOCATIONS

Following the survey guidelines for the Latham's snipe (DAWE 2022), active diurnal searches were undertaken on foot, whereby two (2) observers walked on opposite sides of suitable habitat (i.e. drainage lines / watercourses), while dragging a length of rope to disturb any potential roosting birds. Target species using this method were the threatened Latham's snipe and Australian painted snipe; however, all incidental observations of other fauna were also recorded.

4.2.1.6 Habitat trees

While traversing the subject site for the purposes of the flora and fauna assessment, all potential habitat trees (i.e. containing hollows, fissures and/or other suitable roosting/nesting places) were recorded using a handheld GPS and inspected with a burrow scope where possible.

4.2.1.7 Opportunistic sightings

The random meander technique (Cropper 1993) was used to traverse the site. All incidental records of fauna were recorded.

4.3 Results

4.3.1.1 Amphibians

The following six (6) native frog species were recorded during the field survey:

- Eastern sign-bearing froglet (*Crinia parinsignifera*);
- Common froglet (*Crinia signifera*);
- Striped marsh frog (*Limnodynastes peronii*);
- Spotted grass frog (*Limnodynastes tasmaniensis*);
- Green tree frog (*Litoria caerulea*); and
- Eastern dwarf tree frog (*Litoria fallax*).

The threatened Green and gold bell frog was targeted during fauna surveys but was not recorded during the field assessment. Further discussion of the likely presence of this species and the suitability of available habitat is provided in **SECTION 5.2.2** and **APPENDIX 3**.

4.3.1.2 Reptiles

The following two (2) native reptile species were recorded during the field survey:

- Dark-flecked garden sunskink (*Lampropholis delicata*); and
- Water dragon (*Intellagama lesueurii*).

4.3.1.3 Birds

The field assessment recorded 30 native bird species and two (2) exotic bird species (**TABLE 7**). No evidence of the threatened bird species was recorded during diurnal / nocturnal searches or call playback sessions.

TABLE 7
BIRD SPECIES RECORDED DURING FIELD ASSESSMENTS

Common name	Species
Pacific black duck	*Anas superciliosa*
Australasian darter	*Anhinga novaehollandiae*
Australian pipit	*Anthus novaeseelandiae*
Wedge-tailed eagle	*Aquila audax*
Sulphur crested cockatoo	*Cacatua galerita*
Australian wood duck	*Chenonetta jubata*
Golden-headed Cisticola	*Cisticola exilis*
Australian raven	*Corvus coronoides*
Brown quail	*Coturnix ypsilophora*
Pied butcherbird	*Cracticus nigrogularis*
Laughing kookaburra	*Dacelo novaeguineae*
White-faced heron	*Egretta novaehollandiae*
Black-shouldered kite	*Elanus axillaris*
Galah	*Eolophus roseicapilla*
Magpie lark	*Grallina cyanoleuca*
Australia magpie	*Gymnorhina tibicen*
Welcome swallow	*Hirundo neoxena*
Superb fairy-wren	*Malurus cyaneus*
Red-browed finch	*Neochmia temporalis*
Crested pigeon	*Ocyphaps lophotes*
House sparrow*	*Passer domesticus*
Little pied cormorant	*Phalacrocorax melanoleucos*
Eastern rosella	*Platycercus eximius*
Tawny frogmouth	*Podargus strigoides*
Willie wagtail	*Rhipidura leucophrys*
Pied currawong	*Strepera graculina*
Common starling*	*Sturnus vulgaris*
Australasian grebe	*Tachybaptus novaehollandiae*
Australian white ibis	*Threskiornis moluccus*
Straw-necked ibis	*Threskiornis spinicollis*
Rainbow lorikeet	*Trichoglossus haematodus*
Masked lapwing	*Vanellus miles*

4.3.1.4 Mammals

The eastern grey kangaroo (*Macropus giganteus*) was the only native mammal species recorded during the field assessment.

The following five (5) exotic mammal species were recorded on the subject site during diurnal and/or nocturnal surveys:

- Dog (*Canis familiaris*);
- Fox (*Vulpes vulpes*);
- Horse (*Equus caballus*);
- Rabbit (*Oryctolagus cuniculus*); and
- Sheep (*Ovis aries*).

4.3.1.5 Habitat trees

Seven (7) overstorey native trees were recorded across the subject site (**FIGURE 8**). Overall, there were a limited number of potential habitat features identified (i.e. hollows) and further inspection using a burrow scope revealed no use by fauna.

Given these trees are scattered and on the fringe of a fragmented patch, their value as habitat for all but highly mobile and disturbance adapted species is therefore considerably diminished.

5 HABITAT SUITABILITY ASSESSMENT

5.1 Introduction

The suitability of the habitats on the subject site for listed threatened fauna species identified in database searches was assessed to determine those species could potentially occur.

The impacts associated with current land uses, vegetation clearing, land, and waterway erosion/degradation, weed and feral invasion and previous fire regimes were all considered when completing habitat suitability assessments. Particular attention was paid to habitat features such as:

- Condition, flow and water quality of drainage lines and bodies of water;
- Areas of dense vegetation;
- Vegetation connectivity and proximity to neighbouring areas of intact vegetation;
- mature trees with hollows, fissures and/or other suitable roosting/nesting places;
- Preferred Koala Food Trees (PKFTs);
- characteristic signs of foraging (e.g. glider feeding scars);
- hollow logs/debris and areas of dense leaf litter;
- connectivity and proximity to neighbouring areas of intact vegetation; and
- caves and/or man-made structures suitable as microchiropteran bat roost sites.

Potential occurrences of threatened flora species are discussed as *unlikely*, *possible,* or *likely* to occur in habitats on the subject site. Possible occurrences are species which may occur sporadically or are provided with small areas of potentially suitable habitat. Likely occurrences are provided with habitat of high quality.

5.2 Applicability to the subject site

5.2.1 Flora

Eighteen (18) threatened flora species were identified in the database searches that are known to occur or considered possible occurrences within 10 km of the subject site. Based on further interrogation of geographic ranges and specific habitat requirements, five (5) species were considered to warrant further examination.

Whilst none of these species were recorded during previous site assessments (Mecone 2019) and were subsequently not recorded during recent targeted surveys, habitat suitability assessments were completed and determined that two (2) of these species could not confidentially be ruled out as possibly occurring within the subject site (**TABLE 8**).

TABLE 8
HABITAT SUITABILITY ASSESSMENT FOR THREATENED FLORA SPECIES THAT HAVE THE POTENTIAL TO OCCUR ON THE SUBJECT SITE

Scientific name	Common name	Likelihood of occurring
Eucalyptus aggregata	Black gum	**Unlikely** Often grows in open woodland with a grassy ground layer, and on occasion is found as isolated paddock trees in modified native or exotic pastures. A total of only seven (7) native trees were observed on the subject site, none of which were Black gum (*Eucalyptus aggregata*).
Prasophyllum petilum	Tarengo leek orchid	**Unlikely** Has been recorded in open grassland sites, as well as grassy box-gum woodland. Despite this, the species is likely to be highly susceptible to grazing pressures. The latter makes the subject site very unlikely to be suitable to support this species.
Rutidosis leptorhynchoides	Button wrinklewort	**Possible** The species has been recorded in the Goulburn area growing in box-gum woodland, secondary grassland derived from box-gum woodland or in natural temperate grasslands. The species also exhibits an ability to colonise disturbed areas. Potential habitat is considered to occur within VZ1 and VZ2.
Swainsona recta	Small purple-pea	**Possible** Known to exist in the area and has a historical relationship with the grassy understorey of box-gum woodland, namely Blakely's red gum and yellow box. Potential habitat is considered to occur within VZ1.
Thesium australe	Austral toadflax	**Unlikely** Can occur in grassland and grassy woodland away from the coast, and often in association with kangaroo grass (*Themeda australis*). Suitable habitat is not considered to be present on the subject site and the species is known to be susceptible to grazing pressures.

5.2.2 Fauna

5.2.2.1 Amphibians

The habitat requirements of most species are strongly influenced by factors such as climate, distance to water bodies, riparian vegetation, hydrological and morphological characteristics of water bodies and the availability of suitable micro-habitat for aestivation and shelter.

Grasslands, including those available on the subject site, provide suitable habitat for a range of amphibian species, particularly along drainage depressions, soaks and dams. Species commonly encountered in grassland communities include the common froglet (*Crinia signifera*), Eastern sign bearing froglet (*Crinia parinsignifera*), striped marsh frog

(*Limnodynastes peronii*), spotted grass frog (*Limnodynastes tasmaniensis*), Eastern dwarf tree frog, and Verreaux's frog (*Litoria verreauxii*). Three (3) of these species were recorded during the field assessment.

The highest quality habitat features for amphibians on the subject site are likely to be associated with areas of dense grassland, permanent farm dams and natural ephemeral watercourses / drainage lines.

It cannot be conclusively ruled out that the green and gold bell frog (*Litoria aurea*) (GGBF) would occur on the subject site due to the presence of marginally suitable breeding habitat (i.e. stock dams, still ephemeral water bodies) that are unshaded and nearby grassy habitat (see **APPENDIX 3** for habitat suitability assessment). Notwithstanding this, given the closest record of the GGBF was in 1975 from approximately 5 km distant (Source: ALA), it is considered **highly unlikely** that this species is present on the subject site. In addition, the subject site is consistent with some of the Key Threatening Processes (KTPs) to this species; including:

i. predation by feral animals such as foxes;

ii. disturbance to suitable habitat by land management such as grazing; and

iii. additional threats that are likely but not confirmed (as examples, alteration to drainage patterns, impacts to water quality due to herbicides or other chemical pollutants, and loss of connectivity) (DoPIE 2017).

5.2.2.2 Birds

Apart from seven (7) scattered Blakely's red gum trees, the subject site is lacking in any suitable structural (i.e. nest hollows) or floristic (i.e. flowering trees) resources to support the majority of threatened species listed in **TABLES 2 & 4**. These species include Regent honeyeater (*Anthochaera Phrygia*), Gang-gang cockatoo (*Callocephalon fimbiatum*), Glossy black-cockatoo (*Calyptorhynchus lathami*), Varied sittella (*Daphoenositta chrysoptera*), Painted honeyeater (*Grantiella picta*), Swift parrot (*Lathamus discolor*), Black-faced monarch (*Monarcha melanopsis*), Satin flycatcher (*Myiagra cyanoleuca*), Scarlet robin (*Petroica boodang*), Pilotbird (*Pycnoptilus floccosus*), and Rufous fantail (*Rhipidura rufifrons*).

Due to the presence of Blakely's red gum, it cannot be conclusively ruled out that the Superb parrot (*Polytelis swainsonii*) is present in the vicinity from time-to-time; however, the value of the scattered trees on the subject site are considered to be of little value to this species in comparison to nearby contiguous forests (e.g. Pomaderris Nature Reserve which occurs approx. 4.5 km to the south-east).

Low-lying areas across the subject site such as dams, watercourses and drainage lines provide potentially suitable forage habitat for some migratory bird species including:

- Great egret (*Ardea alba*);
- Cattle egret (*Ardea ibis);* and
- Rainbow bee-eater (*Merops ornatus*).

These species can also show a preference towards cleared and/or semi-cleared farmland, paddocks, and agricultural lands (see **APPENDIX 3** for detailed habitat suitability assessments). It should be noted that while the subject site provides such habitat types, these features are in considerable abundance across the region, and the subject site is unlikely to represent 'important habitat' for any of these species.

Further interrogation of habitat suitability and importance was undertaken for listed/migratory shorebirds using the EPBC Act Policy Statement 3.21 - *Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species*. This assessment determined that the subject site does not contain 'important habitat' for any of the below species, and therefore a significant impact is considered unlikely (see **SECTION 8.2.6** for further details):

- Sharp-tailed sandpiper (*Calidris* acuminata);
- Curlew sandpiper (*Calidris* ferruginea);
- Latham's snipe (*Gallinago hardwickii);* and
- Australian painted snipe (*Rostratula australis*).

Given the surrounding landscape comprises several rivers, major/minor waterways and watercourses, and stock dams, the following migratory species may aerially traverse the area, but are highly unlikely to rely on resources available on the subject site:

- Fork-tailed swift (*Apus pacificus*);
- White-bellied sea eagle (*Haliaeetus leucogaster*); and
- White-throated needletail (*Hirundapus caudactus*).

In addition, the presence of grasslands provides marginally suitable forage habitat but no suitable roosting or nest sites for threatened raptor species such as the Grey falcon (*Falco hypoleucos*), Black falcon (*Falco subniger*), and Little eagle (*Hieraaetus morphnoides*). Notwithstanding this, these species occupy extensive home-ranges and given the broader landscape, the subject site does not contain habitat that is considered critical to their survival.

5.2.2.3 Invertebrates

Although it would be imprudent to conclusively rule out the presence of Key's matchstick grasshopper (*Keyacris* scurra) or the Golden sun moth (*Synemon plana*), both species are considered unlikely to be present on the subject site due to habitat modification and ongoing threatening processes.

Both species are typically recorded in habitat that is dominated by native grasses including wallaby grasses (*Austrodanthonia spp.*) and/or Kangaroo grass (*Themeda triandra*) and/or Spear-grasses (*Austrostipa spp.*). These native grasses are either absent from the subject site or limited to small, scattered clumps. An absence of these habitat features is likely to rule out the presence of the Golden sun moth from the subject site however, Key's matchstick grasshopper has (on occasions) been recorded in areas void of these species.

Notwithstanding this, one of the key principal threats to the Key's matchstick grasshopper is over-grazing. Consequently, and due to the species limited dispersal ability (unlike other grasshoppers), long-term and large-scale grazing like that associated with the subject site is likely to have resulted in their decline. As a result and given the presence of higher quality habitat throughout the landscape, it is considered highly unlikely that the Key's matchstick grasshopper persists on the subject site.

5.2.2.4 Mammals

Small terrestrial mammals generally occur in highest densities in association with a complex vegetation structure. A dense understorey layer, which provides shelter from predators and provides nesting opportunities, is particularly important. In general, medium-large terrestrial mammals such as macropods select habitats which provide a dense cover for shelter and refuge and open areas for feeding. The larger species tend to occupy drier more open habitats: the smaller species, moister and more densely vegetated habitats.

Arboreal mammals that occur in the region (apart from the koala) utilise tree hollows for nesting and shelter (although the common ringtail possum *Pseudocheirus peregrinus* is not dependent on hollows). Smith and Lindenmeyer (1988) consider that shortage of nest hollows is likely to limit arboreal mammal populations where density of hollow bearing trees is less than 2 to 8 trees per hectare.

Arboreal folivores are widespread and abundant but exhibit local variation in response to such factors as tree species composition, foliage protein and fibre levels, leaf toughness, toxins, forest structure and the availability of shelter sites. Arboreal folivores are expected to be most abundant in areas of high productivity, high soil fertility and moderate climate, in conjunction with adequate shelter and suitable foraging substrate.

Arboreal nectarivore/insectivores feed on a wide variety of plant and insect exudates including the nectar of flowering eucalypts, and shrubs such as Banksia and Acacia sp. These species also feed extensively on insects, particularly under the shedding bark of eucalypts. The distribution of nectarivore/insectivores is considered to be related to the abundance of nectar and pollen producing plants, the abundance of bark shedding eucalypts which harbour insect prey, and the occurrence of sap and gum exudate producing trees and shrubs (*e.g.* Acacia sp.). Arboreal nectarivores and insectivores are generally hollow dependent species.

The cleared nature of the subject site, and lack of structural complexity and habitat diversity (e.g. hollow-bearing trees, intact and preferred vegetation, rocky outcrops, caves) is likely to result in very limited nesting and foraging opportunities for threatened terrestrial or arboreal mammals. It is unlikely the subject site forms a critical home range component for the following threatened species (see **APPENDIX 3** for species habitat suitability assessment):

- Koala (*Phascolarctos cinereus*);
- Greater glider (*Petauroides volans*);

- Brush-tailed rock wallaby (*Petrogale penicillata*);
- New Holland mouse (*Pseudomys novaehollandiae*); and
- Spotted-tailed quoll (*Dasyurus maculatus*).

Insectivorous bats overlap considerably in diet and broad vegetation preferences (Hall 1981) but specialise in foraging in specific layers or substrates within the forest (Crome and Richards 1988). The subject site generally lacks suitable roosting (i.e. caves, tree hollows/crevices etc.), with the exception of a small handful of isolated trees, or forage habitat to be of value to threatened Microchiroptera species listed in **TABLES 2 & 4** (see **APPENDIX 3** for species habitat suitability assessments), particularly when considered in the context of available habitat within nearby contiguous forests (e.g. Pomaderris Nature Reserve which occurs approx. 4.5 km to the south-east).

The grey-headed flying-fox (*Pteropus poliocephalus*) may traverse the subject site from time to time however, a paucity of flowering native trees would provide a very limited forage resource when compared to forage resource availability in the wider locality.

5.2.2.5 Reptiles

The quality of habitat for reptiles is strongly influenced by the structural characteristics of vegetation (e.g. complexity of vegetation density and vertical strata) and ground cover (e.g. woody debris and rocky outcrops) which influence microclimate, solar irradiance and the availability of suitable basking and shelter sites (Garden *et al.* 2007).

Because only a few Australian reptile species are frugivorous, omnivorous or herbivorous (Dubas and Bull 1991), the nutritional composition of vegetation and vegetation species are less important than the structural features (e.g. basking sites, hollows, leaf litter) that a vegetation community can provide (Garden *et al.* 2007).

Open and disturbed grassland, like those consistent across the subject site, have the potential to support some common reptile species however, a lack of suitable habitat features would suggest that reptiles are largely absent.

Two (2) threatened reptile species were identified within 10 km of the subject site using database searches (**TABLE 2**) however, neither are considered a possible occurrence on the subject site. Whilst the striped legless lizard (*Delma impar*) is a grassland specialist often mixed with native and exotic perennial and annual species, of which some were recorded across the subject site, the main threat to this species is habitat degradation and destruction by (among other things) extended intense grazing pressures such as those consistent with the subject site. Whilst it has been noted that the striped legless lizard can persist in these disturbed environments for some time, they are typically eventually eliminated. This is evidenced by ALA occurrence records showing the most recent record of this species within 70 km of the subject site in 1997. Given its extended history of clearing and grazing, the subject site is considered unlikely to support this species.

5.3 Summary

Based on field assessments and/or habitat suitability, 14 threatened and/or migratory species were considered possible occurrences on or near the subject site (see **APPENDIX 3** for habitat suitability assessments). Of these, the following seven (7) species are wide-ranging and are more likely to aerially traverse the subject site on occasion rather than utilise limited resources available:

- Fork-tailed swift;
- White-bellied sea eagle;
- White-throated needletail;
- Grey falcon;
- Black falcon;
- Little eagle; and
- Grey-headed flying-fox.

With the above species excluded, suitable habitat is only realistically available for the following seven (7) threatened and/or migratory bird species on the subject site:

- Great egret;
- Cattle egret;
- Rainbow bee-eater;
- Sharp-tailed sandpiper;
- Curlew sandpiper;
- Latham's snipe; and
- Australian painted snipe.

The highest quality habitat for threatened and/or migratory bird species is limited to low-lying areas across the subject site such as dams, watercourses, and drainage lines. The remainder of the subject site is highly degraded and provides limited ecological value.

No other threatened fauna species are considered a possible occurrence due to an absence of suitable habitat types and/or structural diversity.

6 CORRIDORS AND CONNECTIVITY

6.1 Background

The term 'connectivity' is used to describe the degree to which the landscape facilitates or impedes the movement of species among habitat areas (Bélisle 2005). The level of connectivity between habitat areas in the landscape can be described along a (high – medium – low – isolated) continuum.

Landscapes with high levels of connectivity form an unbroken expanse of habitat through which a wide range of the fauna species can easily move to or between high quality areas. Landscapes with low levels of connectivity are characterised by habitat areas that are bisected by wide gaps, and where the quality and quantity of remaining habitat is reduced (habitat fragmentation). Habitat fragmentation impedes the movement of species among remaining suitable habitat areas (Andrén 1994; Fahrig 2003) and generally restricts movement and increases threats to all but the most mobile of species.

At a broad landscape scale, maintaining habitat connectivity is necessary to maintain the long-term viability of species populations (Beier and Noss 1998). In fragmented landscapes, corridors of native vegetation (ecological corridors) can enhance landscape connectivity by (i) providing habitat for a range of species; and (ii) facilitating safe movement between larger, more suitable habitat areas.

Three broad types of corridors can be distinguished. These are:

- linear corridors - long, uninterrupted strips of vegetation, such as hedges, strips of forest, and the vegetation growing on banks of rivers and streams;
- steppingstone corridors - a series of small, non-connected habitats that are used to find shelter, food, or to rest; and
- landscape corridors - diverse, uninterrupted landscape elements that provide sufficient cover for safe movement from one core area to another.

6.2 Site assessment

No state or regional corridors are mapped on or in the vicinity the subject site. As part of a wider context, the subject site provides very little corridor value for fauna species in the locality beyond potential stepping-stone habitat for highly-mobile and wide ranging species.

7 POTENTIAL IMPACTS AND RECOMMENDED AMELIORATION MEASURES

7.1 Introduction

The following sections examine the likely direct and indirect impacts of the proposed development on the biodiversity and habitat values of the subject site. Amelioration measures recommended to minimise and mitigate these impacts on the biodiversity and habitat values of the subject site have also been detailed where applicable.

7.2 Potential impacts of the proposed development

7.2.1 Potential impacts on vegetation communities

The proposed development will result in impacts on 176.29 ha of highly degraded exotic / pasture grassland comprising VZ3 and parts of VZ2.

With implementation of proposed amelioration measures (**SECTION 7.3**) there will be no direct or indirect impacts to VZ1, and only a small area (0.18 ha) of lower-lying VZ2 will be impacted.

A summary of vegetation types to be lost and their respective areas is shown in **TABLE 9**. Additional impacts on vegetation communities include:

- Disturbance to the subject site creates opportunities for weeds to colonise.
- Weeds may be introduced to the subject site in construction materials or by vehicles.
- Occupation of the subject site creates opportunities for weeds to become established.
- Landscape species may escape to retained areas of vegetation.
- The removal of vegetation from the subject site represents a minor loss of organic material from the site.

TABLE 9 - DIRECT IMPACTS ON VEGETATION COMMUNITIES

Vegetation Zone (VZ)	Brief Description	Total Area	Area to be impacted	Area to be retained
VZ1	Blakely's red gum woodland (*Eucalyptus blakelyi*) (derived - PCT 1330)	0.38 ha	0.00 ha (0%)	0.38 ha (100%)
VZ2	Exotic/pasture grasses +/- native grasses, sedges, rushes, forbs	7.57 ha	0.18 ha (2.4%)	7.39 ha (97.6%)
VZ3	Cleared land/pasture grasses	260.27 ha	175.93 ha (67.6%)	84.34 ha (32.4%)
	TOTAL	**268.22 ha**	**176.11 ha (65.7%)**	**92.11 ha (34.3%)**

7.2.2 Potential impacts on threatened flora

No threatened flora species were recorded on the subject site however potentially suitable habitat, albeit highly degraded/marginal at best, was identified for the Button wrinklewort (*Rutidosis leptorhynchoides*) and Small purple-pea (*Swainsona recta*) within VZ1 and VZ2.

Impacts listed above for vegetation communities generally (**SECTION 7.2.1**) may also impact on potential habitat for these species, however with implementation of proposed amelioration measures (**SECTION 7.3.3**) it is considered that there are unlikely to be any significant impacts on these species or their habitat.

7.2.3 Potential impacts on TECs

VZ1 on and adjacent to the subject site is considered to represent a degraded example of the *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* listed as a Critically Endangered Ecological Community (CEEC) within schedules of the BC Act.

Impacts listed above for vegetation communities generally (**SECTION 7.2.1**) may also impact on this CEEC, however with implementation of proposed amelioration measures (**SECTION 7.3.4**) there will be no direct or indirect impacts on this CEEC.

7.2.4 Potential impacts on fauna

The proposed development will result in some minor loss of foraging and sheltering habitat for common and urban adapted native fauna occurring in the locality. This loss may have the following impacts:

- Minor loss of forage habitat for nectarivorous and insectivorous fauna species.
- Minor increase in the fragmentation of habitat in the locality.
- Minor loss of sheltering and breeding habitat for native fauna.
- Animals may be killed or injured during the clearance of vegetation.

7.2.5 Potential impacts on threatened & migratory fauna species

No threatened or migratory fauna species were recorded from the subject site. However, based on field assessments and/or habitat suitability, 14 threatened and/or migratory species were considered possible occurrences on or near the subject site (see **APPENDIX 3** for habitat suitability assessments). Of these, the following seven (7) species are wide-ranging and are more likely to aerially traverse the subject site on occasion rather than utilise limited resources available:

- Fork-tailed swift;
- White-bellied sea eagle;
- White-throated needletail;
- Grey falcon;
- Black falcon;
- Little eagle; and

- Grey-headed flying-fox.

With the above species excluded, suitable habitat is only realistically available for the following seven (7) threatened and/or migratory bird species on the subject site:

- Great egret;
- Cattle egret;
- Rainbow bee-eater;
- Sharp-tailed sandpiper;
- Curlew sandpiper;
- Latham's snipe; and
- Australian painted snipe.

The highest quality habitat for threatened and/or migratory bird species is limited to low-lying areas across the subject site such as dams, watercourses, and drainage lines. The remainder of the subject site is highly degraded and provides limited ecological value.

Impacts listed above for fauna generally (**SECTION 7.2.4**) may also impact on these species if they utilise the subject site from time to time.

7.2.6 Potential Impacts on waterways and mapped 'Key Fish Habitat'

The proposed development has the potential to impact on waterways on the subject site and associated areas of mapped 'Key Fish Habitat' by:

- altering flow regimes and/or exacerbating existing erosion and sedimentation of waterways;
- creating potential barriers to fish movement;
- disturbance to potential fish habitats including instream structures and/or substrates;
- changes in water quantity and quality entering waterways.

7.2.7 Potential Impacts on nearby ecologically important areas

Several ecologically important areas occur within the vicinity of the subject site but are generally unlikely to be directly or indirectly impacted by the proposed development with the exception of the Gundary Travelling Stock Route which occurs immediately to the south-west of the site (**FIGURE 2**).

The Gundary Travelling Stock Route contains a good quality/undisturbed patch of *Natural temperate grassland of the south eastern highlands* - which is listed as Critically Endangered within schedules of the EPBC Act. There are also historical records of a number of threatened flora and faun species for this TSR including Key's matchstick grasshopper (*Keyacris scurra*) and Button wrinklewort (*Rutidosis leptorhynchoides*).

Potential indirect impacts on this TSR may occur as a result of the proposed development including:

- Weeds may be inadvertently introduced to the TSR in construction materials or by vehicles;
- Occupation of the subject site creates opportunities for weeds to escape to the TSR; and
- Landscape species may escape to the TSR.

7.3 **Recommended amelioration measures**

7.3.1 Introduction

This section provides recommendations regarding amelioration measures that should be implemented to protect ecologically important areas/habitat for threatened flora and fauna species and/or migratory fauna species considered a possible occurrence on the subject site.

7.3.2 Amelioration for native vegetation

It is recommended that a Vegetation Management Plan (VMP) be prepared at the development application stage and approved by Council. The VMP should provide guidelines for controlling activities during the pre-clearing and clearing phases of the development and detail how vegetation to be retained and any identified buffer areas should be clearly marked and protected.

Other amelioration measures include:

- Weeds should be controlled during construction.
- Vegetation removed during construction should be mulched for use on the subject site. This will prevent the introduction of weeds from seeds in mulch brought in from elsewhere.
- Weeds should be controlled in landscaped areas and areas of retained vegetation.
- Known environmental weeds should be avoided in landscaping.
- For the trees being retained on the subject site tree protection measures should be used in accordance with recommendations provided by a suitable qualified arborist.

7.3.3 Amelioration for threatened flora

No threatened flora species were recorded on the subject site however potentially suitable habitat, albeit highly degraded/marginal at best, was identified for the Button wrinklewort (*Rutidosis leptorhynchoides*) and Small purple-pea (*Swainsona recta*) within VZ1 and VZ2. All of VZ1 and the vast majority of VZ2 are proposed to be retained and rehabilitated as part of the proposed development (**FIGURE 11)**. These retained and rehabilitated areas should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

Hume Hwy
Rosemont Rd
Barretts Ln
Brisbane Grove Rd
Windellama Rd
Mountain Ash Rd
Gundary Travelling Stock Reserve

LEGEND

- Subject Site

Areas to be Retained, Rehabilitated & Protected Under Environmental Covenants or Similar

- Surveyed native overstorey trees
- Vegetation Zone 1
- 10m buffer to Vegetation Zone 1
- Vegetation Zone 2 areas to be retained
- Key fish habitat areas to be retained
- Waterways
- Waterway buffers (variable width as per the NRAR guidelines)
- 10m buffer to Gundary Travelling Stock Route

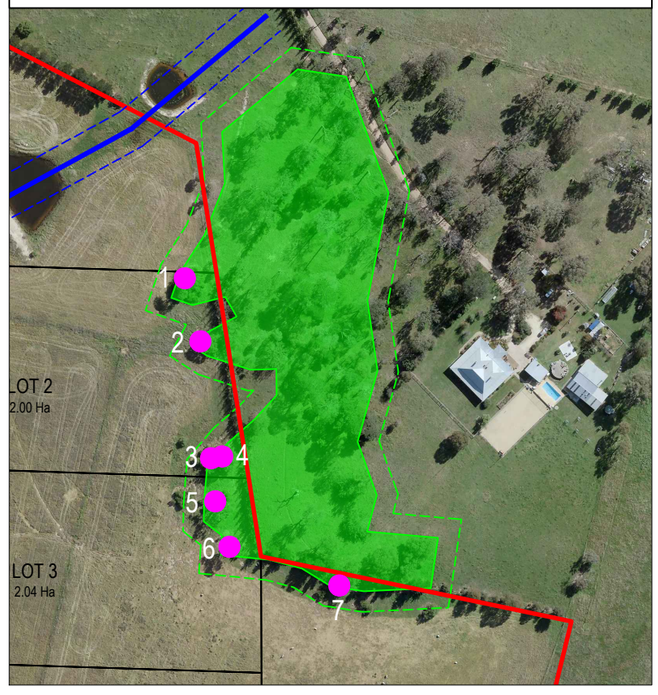
Proposed Development Layout

- Lot Boundary

INSET - VEGETATION ZONE 1

Inset Scale 1:3000 - Lengths in metres

50 0 50 100 150



Scale 1:12 500 - Lengths in metres

100 0 100 200 300 400 500

SOURCE: JWA Site Investigations; MetroMap Aerial dated 15/04/21

SCALE: 1 : 12 500 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Windellama Road Pty Ltd & GTSMF Pty Ltd

PROJECT
Ecological Assessment
Mountain Ash Road, Gundary NSW
Goulburn Mulwaree Council LGA

FIGURE 11

PREPARED: BW
DATE: 17 May 2022
FILE: N21007_EA_20220517.dwg

TITLE
AREAS TO BE RETAINED, REHABILITATED & PROTECTED UNDER ENVIRONMENTAL COVENANTS OR SIMILAR

7.3.4 Amelioration for TECs

VZ1 on the subject site and adjoining patches of this vegetation type on adjoining properties are considered to represent degraded patches of *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions* which is listed as a Critically Endangered Ecological Community (CEEC) within schedules of the BC Act.

It is recommended that VZ1 on the subject site is retained and rehabilitated. This patch and adjoining patches of this vegetation type on adjoining properties should also be protected by a vegetated buffer utilising locally endemic species. The buffer should be a minimum of 10m wide and contain species to allow a dense and fully structured vegetation community to be created (i.e. groundcovers, shrubs and canopy trees).

All of the above retained and rehabilitated areas and associated buffer areas (**FIGURE 11**) should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

7.3.5 Amelioration for fauna

Vegetation clearing for the proposed development will result in loss of habitat for generally common and disturbance adapted fauna species only. Given that no significant ecological features are proposed to be removed (i.e. tree hollows, nests* etc.), the following amelioration would be considered sufficient for vegetation clearing works:

- A suitably qualified ecologist who holds a fauna survey licence is required to manage wildlife onsite during any tree removal and/or disturbance to wildlife habitat. Where translocation is required, the proponent shall seek any relevant permits from the state regulating agency. It is the responsibility of the proponent to ensure all relevant licences have been obtained prior to any fauna interactions.

Recommended additional amelioration measures for fauna include the following:

- Appropriate disposal of rubbish and food scraps reduces opportunities for non-native predators and disturbance adapted competitors.
- Landscape and landfill materials should be sourced from a supplier where Cane toads do not occur.
- Landscape plantings should include native species that will provide forage habitat for nectarivorous and frugivorous birds and bats.

7.3.6 Amelioration for threatened and/or migratory fauna

The vast majority of suitable habitat for threatened and/or migratory species considered possible occurrences on or near the subject site (i.e. VZ1 and VZ2) is proposed to be retained and rehabilitated as part of the proposed development (**FIGURE 11**). These

retained and rehabilitated areas should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

7.3.7 Amelioration for waterways and mapped 'Key Fish Habitat'

Potential impacts on waterways will be reduced through appropriate sediment and erosion control during construction activities (in accordance with a Sediment and Erosion Control Plan to be approved by Council), and appropriate stormwater management design (in accordance with a Stormwater Management Plan to be approved by Council) to ensure all water entering waterways is appropriately treated and does not lead to exacerbation of existing erosion and/or sedimentation of waterways.

All retained waterways and should be retained and buffered in accordance with Guidelines for controlled activities on waterfront land – Riparian Corridors (NRAR 2018) (discussed further in **SECTION 8.5.2**). These buffers (**FIGURE 11**) should be rehabilitated to achieve fully structured native vegetation and protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

7.3.8 Amelioration for nearby ecologically important areas

A vegetated buffer should be provided to the interface of the Gundary Travelling Stock Route utilising locally endemic species (**FIGURE 11**). The buffer should be a minimum of 10m wide and contain species to allow a dense and fully structured vegetation community to be created (i.e. groundcovers, shrubs and canopy trees). This vegetated buffer should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

8 CONSIDERATION OF STATUTORY REQUIREMENTS

8.1 Introduction

This section includes an assessment of the likely impacts of the proposed development with regard relevant Commonwealth, State and local legislation as listed in **SECTION 2**. Detailed assessment of compliance with relevant legislative requirements is provided in the following sections.

8.2 Environment Protection and Biodiversity Conservation Act (1999)

8.2.1 Background

The EPBC Act provides a mechanism for assessing the environmental impact of activities and development on MNES. A person must not, without an approval under the Act, take an action that has or will have, or is likely to have, a significant impact on any of the following MNES:

- world heritage properties or national heritage places.
- declared Ramsar wetlands.
- listed threatened species or ecological community.
- listed migratory species.
- Commonwealth marine area or Commonwealth land.

The Act also prohibits the taking, without an approval under the Act, of:

- a nuclear action; and
- an action in a Commonwealth marine area or on Commonwealth land that has or will have, or is likely to have, a significant impact on the environment.

MNES include:

- declared World Heritage areas.
- declared Ramsar wetlands.
- listed threatened species (Schedule 1 and 2 of the *Commonwealth Endangered Species Protection Act 1992*).
- listed ecological communities.
- listed migratory species (JAMBA and CAMBA).

An action includes a project, development, undertaking or an activity or series of activities. An action does not require approval if it is a lawful continuation of a use of land, sea or seabed that was occurring before the commencement of the Act. An enlargement, expansion or intensification of a use is not a continuation of a use.

The EPBC Act does not require Commonwealth approval for the rezoning of land; however, it does suggest that when rezoning land, planning authorities should consider whether to allow actions that could significantly affect MNES or environment of Commonwealth land. A Commonwealth assessment will be required for proposed activities on the subject site if they affect a MNES. The Commonwealth Department of the Environment has prepared EPBC Act Policy Statements, including the *Matters of National Environmental Significance – Significant Impact Guidelines 1.1* (DotE 2013), which provides a self-assessment process to assist in determining whether an action should be referred to the Commonwealth for a decision on whether assessment and approval is required.

Where a project or action is believed to potentially cause a significant impact on a MNES, it is to be referred to the Australian Government Department of Agriculture, Water and the Environment (DAWE) for assessment as to whether the action is a 'controlled action' requiring Commonwealth approval for the proposed action. The proposed development has been considered against the Principal Significant Impact Guidelines for each of the MNES identified on the subject site. This assessment is provided in the following sections.

8.2.2 Declared world heritage areas

There are no declared World Heritage areas located on or near the subject site.

8.2.3 Declared Ramsar wetlands

There are no Ramsar wetlands near the subject site.

8.2.4 Threatened Ecological Communities (TECs)

The subject site is mapped as potentially containing the following two (2) TECs:

- Natural temperate grassland of the south eastern highlands (NTG-SEH) – critically endangered; and
- White box-yellow box-Blakely's red gum grassy woodland and derived native grassland – critically endangered.

However, as discussed in **SECTION 3.3.4**, based on targeted surveys and condition assessments of the site vegetation in accordance with the Approved Conservation Advice for NTG-SEH TEC (DAWE 2016) and the National Recovery Plan for White box-yellow box-Blakely's red gum grassy woodland and derived native grassland (DECCW 2010), there are no distinct patches on the subject site that satisfy the relevant key diagnostic characteristics or minimum condition thresholds of either of these TEC's to be subject to the referral, assessment, and compliance provisions of the EPBC Act.

8.2.5 Commonwealth listed threatened flora and fauna species

8.2.5.1 Significant impact criteria

An action is likely to have a significant impact on a critically endangered, endangered, or vulnerable species if it results in the following:

- a long-term decrease in the size of a population;
- reduction in the area of occupancy of the species;
- fragments an existing population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupts the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduces disease that may cause the species to decline; or
- interferes with the recovery of the species.

A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to a geographically distinct regional population, or collection of local populations, or a population, or collection of local populations that occur within a particular bioregion.

An 'invasive species' is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.

8.2.5.2 Applicability to the subject site

Habitat suitability assessments combining this EA and information provided in Mecone (2019) determined that, albeit very conservative, two (2) EPBC Act listed flora species - Button wrinklewort (*Rutidosis leptorhynchoides*) and Small purple-pea (*Swainsona recta*) - could possibly to occur within the subject site (**TABLE 8**). Neither of these species were recorded during previous (Mecone 2019) or recent targeted surveys. As a result and given the highly modified and disturbed state of the subject site, it is considered unlikely that these species are present, and no significant impacts (as listed above) are considered likely.

Regardless, the vast majority of potentially suitable habitat for these threatened flora species (i.e. VZ1 and VZ2) is proposed to be retained and rehabilitated as part of the proposed development (**FIGURE 11**). These retained and rehabilitated areas should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

Based on field assessments and/or habitat suitability, four (4) threatened species listed under schedules of the EPBC Act were considered possible occurrences on or near the subject site (see **APPENDIX 3** for habitat suitability assessments). Of these, the following

three (3) species are wide-ranging that are more likely to aerially traverse the subject site on occasion rather than utilise limited resources available:

- White-throated needletail;
- Grey falcon; and
- Grey-headed flying-fox.

With the above species excluded, suitable habitat is only realistically available for the Australia painted snipe on the subject site. The vast majority of potentially suitable habitat for this species (i.e. VZ2) is proposed to be retained and rehabilitated as part of the proposed development (**FIGURE 11**). These retained and rehabilitated areas should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

Whilst the striped legless lizard (Delma impar) is a specialist of grasslands, often mixed with native and exotic perennial and annual species, of which some were recorded across the subject site, the main threat to this species is habitat degradation and destruction by (among other things) extended intense grazing pressures such as those consistent with the subject site. While it has been noted that the striped legless lizard can persist in these disturbed environments for some time, they are typically eliminated from an area by extended intense grazing, pasture improvement, ploughing, drought or other heavy disturbance (Smith and Robertson 1999). This is evidenced by ALA occurrence records showing the most recent record of this species within 70 km of the subject site in 1997.

Given its extended history of clearing and grazing, and continued ploughing and pasture improvement/fodder growing regimes, the subject site is considered unlikely to support this species.

8.2.6 Listed migratory species

8.2.6.1 Significant impact criteria

An action will require approval if the action has, will have, or is likely to have a significant impact on a listed migratory species. Note that some migratory species are also listed as threatened species. The significant impact criteria below are relevant to migratory species that are not threatened.

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles); or
- alter hydrological cycles, destroy, or isolate an area of important habitat for a migratory species; or
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or

- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

An area of 'important habitat' for a migratory species is:

- habitat used by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- habitat that is of critical importance to the species at life-cycle stages; and/or
- habitat utilized by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, the definition of what an 'ecologically significant proportion' of the population is varies with the species (each circumstance needs to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness, and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

The term 'population' in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

8.2.6.2 Relevance to the subject site

Low-lying areas across the subject site such as dams, watercourses and drainage lines provide suitable forage habitat for some migratory bird species including:

- Great egret;
- Cattle egret; and
- Rainbow bee-eater.

These species can also show a preference towards cleared and/or semi-cleared farmland, paddocks, and agricultural lands (see **APPENDIX 3** for detailed habitat suitability assessments). It should be noted that while the subject site provides such habitat types, these features are in abundance across the region.

Given the surrounding landscape comprises several rivers, major / minor waterways and watercourses, and stock dams, the following migratory species may aerially traverse the area, but are highly unlikely to rely on resources available on the subject site:

- Fork-tailed swift (*Apus pacificus*);
- White-bellied sea eagle (*Haliaeetus leucogaster*); and
- White-throated needletail (*Hirundapus caudactus*).

Further interrogation of habitat suitability and importance was undertaken below for listed / migratory shorebirds using the EPBC Act Policy Statement 3.21 - *Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (Commonwealth of Australia 2017). Following the relevant pathway in Figure 2 of the Policy Statement (**FIGURE 12**), the subject site does not contain important habitat for the following migratory shorebirds:

- Sharp-tailed sandpiper (*Calidris* acuminata);
- Curlew sandpiper (*Calidris* ferruginea);
- Latham's snipe (*Gallinago hardwickii);* and
- Australian painted snipe (*Rostratula australis*).

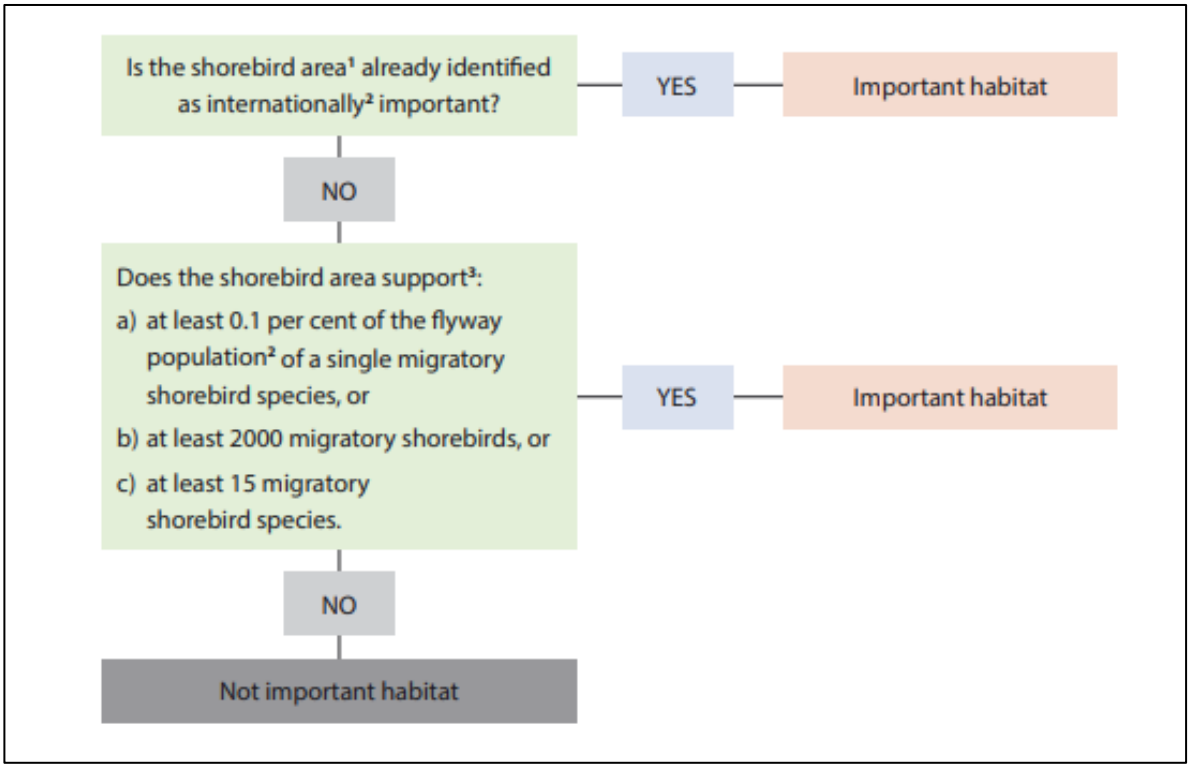


FIGURE 12. PROCESS FOR IDENTIFYING IMPORTANT HABITAT FOR MIGRATORY SHOREBIRDS (SOURCE: COMMONWEALTH OF AUSTRALIA 2017).

It should be noted that habitat important to Latham's snipe is not regularly identified using the process outlined above. Instead, important habitat for Latham's snipe is described as areas that have previously been identified as internationally important for the species, or areas that support at least 18 individuals of the species. With consideration of these points, important habitat for the Latham's snipe does not exist on the subject site.

Given the above considerations and extent of similar habitat types across the landscape, the proposed development is unlikely to impact habitat critical or any other migratory bird species listed in **TABLES 3 or 4**.

8.2.7 Requirement for Commonwealth Referral

Based on the assessment above, a referral under the EPBC Act is **not** considered necessary. No offsets are required under the Commonwealth *EPBC Act Environmental Offsets Policy* (2012).

8.3 Biodiversity Conservation Act (2016)

8.3.1 Background

The BC Act commenced on the 25th August 2017 and, together with the *Biodiversity Conservation Regulation 2017* (BCR), outlines the framework for addressing impacts on biodiversity from development and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme (BOS).

The BOS creates a transparent, consistent, and scientifically based approach to biodiversity assessment and offsetting for all types of development that are likely to have a significant impact on biodiversity. It also establishes biodiversity stewardship agreements, which are voluntary in-perpetuity agreements entered into by landholders, to secure offset sites.

There are five key steps to participating in the BOS for developers or landholders ('proponents') who want to undertake development or clearing.

- Step 1 – The proponent determines whether the BOS applies.
- Step 2 – An accredited assessor applies the Biodiversity Assessment Method and offsetting rules to the activity.
- Step 3 – The consent authority assesses the application and determines whether to approve or refuse the application.
- Step 4 – The consent authority determines the application and sets the offset obligation.
- Step 5 – The proponent satisfies its credit obligation and can begin the approved activity.

Step 1 of this process has been completed (in the following sections) as part of this ECA to determine if the BOS applies to the proposed development. Additional steps (if required) will be completed separately, and in addition, to this ECA report.

8.3.2 Biodiversity Offsets Scheme (BOS)

8.3.2.1 Background

The BOS applies to:

1. local development assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP & A Act) that triggers the BOS threshold or is likely to significantly affect threatened species based on the test of significance in section 7.3 of the BC Act;

2. state significant development and state significant infrastructure projects, unless the Secretary of the Department of Planning and Environment and the Chief Executive of OEH determine that the project is not likely to have a significant impact;
3. biodiversity certification proposals;
4. clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the BOS threshold and does not require development consent;
5. clearing of native vegetation that requires approval by the Native Vegetation Panel under the *Local Land Services Act 2013* (LLS Act); and
6. activities assessed and determined under Part 5 of the EP & A Act (generally, proposals by government entities), if proponents choose to 'opt in' to the BOS.

Point 1 above applies to the proposed development.

8.3.2.2 The BOS threshold

The BOS Threshold is a test used to determine when is necessary to engage an accredited assessor to apply the Biodiversity Assessment Method (BAM) to assess the impacts of a proposal.

It is used for local developments (development applications submitted to councils) and clearing that does not require development consent in urban areas and areas zoned for environmental conservation i.e. under the SEPP (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP).

The BCR sets out threshold levels for when the BOS will be triggered. The threshold has two elements:

1. whether the amount of native vegetation being cleared exceeds a threshold area set out below; and
2. whether the impacts occur on an area mapped on the Biodiversity Values Map (BVM) published by the Minister for the Environment.

If clearing and other impacts exceeds either trigger, the BOS applies to the proposed development including biodiversity impacts prescribed by clause 6.1 of the BCR.

Area clearing threshold

The area threshold varies depending on the minimum lot size (shown in the lot size maps made under the relevant LEP), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP) as shown in **TABLE 10** below.

The area threshold applies to all proposed native vegetation clearing associated with a proposal, regardless of whether this clearing is across multiple lots. In the case of a

subdivision, the proposed clearing must include all future clearing likely to be required for the intended use of the land after it is subdivided.

TABLE 10
BOS AREA CLEARING THRESHOLD

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

The minimum lot size associated with the subject property is 10 ha. An area clearing threshold of 0.5 ha or more therefore applies for entry into the BOS. The proposed development will not result in the removal of more than 0.5 ha (5,000 m^2) of native vegetation from the subject site, and entry into the is therefore **not triggered** by the area clearing threshold.

Biodiversity Values Map (BVM) threshold

The BVM identifies land with high biodiversity value, as defined by clause 7.3(3) of the BCR. The BOS applies to all clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the BCR on land identified on the map.

The subject site does not occur within an area of high biodiversity value on the BVM. Entry into the BOS is therefore **not triggered** by the BVM threshold.

8.3.3 Test of Significance

8.3.3.1 Background

In addition to the BOS Threshold, proponents are also required to carry out a 'test of significance' for all local development proposals. The test of significance is set out in section 7.3 of the BC Act and is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

In determining the nature and magnitude of an impact, it is important to consider matters such as:

- Pre-construction, construction and occupation/maintenance phases;
- All on-site and offsite impacts, including location, installation, operation and maintenance of auxiliary infrastructure and fire management zones;
- All direct and indirect impacts;
- The frequency and duration of each known or likely impact/action;
- The total impact which can be attributed to that action over the entire geographic area affected, and over time;
- The sensitivity of the receiving environment; and

- The degree of confidence with which the impacts of the action are known and understood.

Recovery and threat abatement plans, priorities action statements and threatened species profiles may provide further guidance on whether an action/activity is likely to be significant.

Application of the precautionary principle requires that a lack of scientific certainty about the potential impacts of an action does not itself justify a decision that the action is not likely to have a significant impact. If information is not available to conclusively determine that there will not be a significant impact on a threatened species, population or ecological community, or its habitat, then it should be assumed that a significant impact is likely.

8.3.3.2 Endangered Ecological Communities (EECs)

As discussed in **SECTION 3.3.5**, VZ1 is considered to represent an area of degraded CEEC *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*. A 'Test of Significance" has therefore been completed in accordance with the requirements of Section 7.3 of the BC Act to undertake a qualitative analysis of the likely impacts of the proposed development (**APPENDIX 4**). The assessment has determined that the proposed development is unlikely to significantly affect this threatened ecological community.

Furthermore, VZ1 on the subject site is proposed to be retained and rehabilitated (**FIGRE 11**). This patch and adjoining patches of this vegetation type on adjoining properties should also be protected by a vegetated buffer utilising locally endemic species. The buffer should be a minimum of 10m wide and contain species to allow a dense and fully structured vegetation community to be created (i.e. groundcovers, shrubs and canopy trees).

All of the above retained and rehabilitated areas and associated buffer areas should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

8.3.3.3 Threatened flora

No threatened flora species were recorded on the subject site however potentially suitable habitat, albeit highly degraded/marginal at best, was identified for the Button wrinklewort (*Rutidosis leptorhynchoides*) and Small purple-pea (*Swainsona recta*) within VZ1 and VZ2.

A 'Test of Significance" has therefore been completed in accordance with the requirements of Section 7.3 of the BC Act to undertake a qualitative analysis of the likely impacts of the proposed development (**APPENDIX 4**). The assessment has determined that the proposed development is unlikely to significantly affect these threatened species or their habitats.

Furthermore, All of VZ1 and the vast majority of VZ2 are proposed to be retained and rehabilitated as part of the proposed development (**FIGURE 11**). These retained and rehabilitated areas should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

8.3.3.4 Fauna

The presence of grasslands across the subject site provides marginally suitable forage habitat but no suitable roosting or nest sites for threatened raptor species such as the Black falcon (*Falco subniger*) and Little eagle (*Hieraaetus morphnoides*). Notwithstanding this, these species occupy extensive home-ranges and given the broader landscape, the subject site does not contain habitat that is considered critical to their survival.

In addition, and as addressed in **SECTION 8.2.5.2**, the Grey-headed flying-fox may traverse the subject site; however, a paucity of flowering native trees would provide a very limited forage resource when compared to the wide locality.

Given the results of the field and habitat suitability assessments, suitable habitat is only realistically available for the Australia painted snipe on the subject site. A 'Test of Significance" has therefore been completed in accordance with the requirements of Section 7.3 of the BC Act to undertake a qualitative analysis of the likely impacts of the proposed development (**APPENDIX 4**). The assessment has determined that the proposed development is unlikely to significantly affect this threatened species or its habitats.

The vast majority of potentially suitable habitat for this species (i.e. VZ2) is proposed to be retained and rehabilitated as part of the proposed development (**FIGURE 11**). These retained and rehabilitated areas should be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

8.4 Biodiversity and Conservation SEPP (2021) - Koala Habitat Protection (2020)

8.4.1 Background

The Biodiversity and Conservation SEPP 2021 commenced on 1st March 2022. Chapter 3 - Koala Habitat Protection 2020 of the Biodiversity and Conservation SEPP contains provisions from the Koala SEPP 2020 and, as an interim measure, applies in the NSW core rural zones of RU1, RU2 and RU3, except within the Greater Sydney and Central Coast areas. This is an interim measure while new land management and private native forestry codes are developed.

The principles of Chapter 3 - Koala Habitat Protection 2020 is to:

> "*encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline*" -
>
> *a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and*
>
> *b) by encouraging the identification of areas of core koala habitat, and*
>
> *c) by encouraging the inclusion of areas of core koala habitat in environment protection zones.*

8.4.2 Applicability to the subject site

The subject site is zoned as RU1 – Primary Production under the GMLEP 2012.

In accordance with the requirements of Part 3.2, Clause 3.5 of Chapter 3 - Koala Habitat Protection 2020 of the Biodiversity and Conservation SEPP, as the site is more than 1 ha in size (including adjoining land in the same ownership), before a Council may grant consent to a development application, it must assess whether the development is likely to have any impact on koalas or koala habitat based on the following steps.

Step 1 – is the land potential koala habitat?

Part 3.1, Clause 3.2 of Chapter 3 - Koala Habitat Protection 2020 of the Biodiversity and Conservation SEPP 'potential koala habitat' is defined as follows:

> *"Potential koala habitat means areas of native vegetation where trees of the types listed in Schedule 3 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component."*

Although only relevant to seven (7) trees, VZ1 contains potential koala habitat as per the definitions above and therefore must comply with Step 2.

Step 2 – is the land core koala habitat?

Part 3.1, Clause 3.2 of Chapter 3 - Koala Habitat Protection 2020 of the Biodiversity and Conservation SEPP 'core koala habitat' is defined as follows:

> *"Core koala habitat means an area of land with a resident population of koalas, evidenced by attributes such as breeding females, being females with young, and recent sightings of and historical records of a population."*

The nearest record of koalas to the subject site is approximately 12 km to the east from 2009 (source ALA). Given this and the fragmented nature of VZ1, it is not considered to represent 'core koala habitat'.

Based on the above assessment, it is not necessary to consider the subject site for the purposes of the Chapter 3 - Koala Habitat Protection 2020 of the Biodiversity and Conservation SEPP.

8.5 Water Management Act (2000)

8.5.1 Introduction

The objects of this Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations and, in particular:

a) to apply the principles of ecologically sustainable development, and

b) to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality, and

c) to recognise and foster the significant social and economic benefits to the State that result from the sustainable and efficient use of water, including—

   i. benefits to the environment, and

   ii. benefits to urban communities, agriculture, fisheries, industry and recreation, and

   iii. benefits to culture and heritage, and

   iv. benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water,

d) to recognise the role of the community, as a partner with government, in resolving issues relating to the management of water sources,

e) to provide for the orderly, efficient and equitable sharing of water from water sources,

f) to integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna,

g) to encourage the sharing of responsibility for the sustainable and efficient use of water between the Government and water users,

h) to encourage best practice in the management and use of water.

8.5.2 Applicability to the subject site

Any impacts by the development on waterways mapped on the relevant topographical map will generally trigger assessment of compliance with the Guidelines for controlled activities on waterfront land – Riparian Corridors (NRAR 2018). The policy sets out Vegetated Riparian Zones (VRZ) for watercourses of distanced between 10 and 40 m based on stream order. In relation to the waterway buffer treatments, the guidelines require:

- the environmental functions of riparian corridors to be maintained or rehabilitated to achieve fully structured native vegetation;
- minimise disturbance and harm to the buffer areas;
- minimise the number of creek crossings and provide perimeter road separating development;
- locate services and infrastructure outside of the buffers; and

- treat stormwater run-off before discharging into the buffers.

The proposed development has been designed to minimise the number of creek crossing as far as possible. Applicable buffers have been identified on the development layout (**FIGURE 11**) and it is proposed to rehabilitate these buffers to achieve fully structured native vegetation. These rehabilitated buffers will be protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

8.6 Fisheries Management Act (1994)

8.6.1 Introduction

One of the key objectives of the FM Act is to conserve 'key fish habitats'. 'Key fish habitats' are not defined in the FM Act however, and sections 3.2.1 and 3.2.2 of the *Policy and guidelines for fish habitat conservation and management* (DPI 2013) outlines the approach adopted by NSW Department of Primary Industries (DPI) to define these habitats to ensure effort and resources are focused on those most important for fisheries conservation.

NSW DPI recognises that certain types of activities have varying degrees of impact on key fish habitats and, as such, require different levels of control and regulation. As a general principle, NSW DPI requires that proponents should, as a first priority, aim to avoid impacts upon key fish habitats. Where avoidance is impossible or impractical, proponents should then aim to minimise impacts. Any remaining impacts should then be offset with compensatory works.

The subject site contains three (3) main watercourses / drainage lines that are mapped as 'Key Fish Habitat' under the FM Act (**FIGURE 5**). To determine the importance of the habitat on the subject site, an assessment against *Section 3.2 Key Fish Habitat Management Policies* (DPI 2013) is provided below.

8.6.2 Habitat sensitivity

NSW DPI assesses activity and development proposals in relation to general policies and with consideration for the 'sensitivity' of the affected fish habitat. In this context, 'sensitivity' is defined by the importance of the habitat to the survival of fish (noting that 'fish' under the FM Act includes all aquatic invertebrates) and its robustness (ability to withstand disturbance).

Section 3.2.1 Habitat sensitivity; Table 1 - Key fish habitat and associated sensitivity classification scheme, defines the following three (3) key fish habitat types:

- TYPE 1 – Highly sensitive key fish habitat
- TYPE 2 – Moderately sensitive key fish habitat
- TYPE 3 – Minimally sensitive key fish habitat

The larger, more well defined watercourses on the subject site are considered to represent TYPE 2 fish habitats, generally in accordance with the key fish habitat mapping.

For the purposes of the *policy and guidelines for fish habitat conservation and management* the following are not considered key fish habitat:

- First and second order streams on gaining streams (based on the Strahler method of stream ordering);
- Farm dams on first and second order streams or unmapped gullies;
- Agricultural and urban drains;
- Urban or other artificial ponds (e.g. evaporation basins, aquaculture ponds);
- Sections of stream that have been concrete-lined or piped (not including a waterway crossing); and
- Canal estates.

The first three (3) points above are considered to appropriately describe a number of the less well defined watercourses / drainage lines across the subject site.

8.6.3 Waterway classification

In some instances, NSW DPI assesses proposals in relation to habitat sensitivity TYPE (as above) and also waterway CLASS. The waterway classification scheme factors in the functionality of the waterway as fish habitat.

Based on *Section 3.2.2 Waterway classification; Table 2 – Classification of waterways for fish passage*, mapped watercourses / drainage lines across the subject site, including those mapped as key fish habitat, are considered to align with the following CLASSES:

- **CLASS 3 – Minimal key fish habitat**
  Named or unnamed waterway with intermittent flow and sporadic refuge, breeding or feeding areas for aquatic fauna (e.g. fish, yabbies). Semi-permanent pools form within the waterway or adjacent wetlands after a rain event. Otherwise, any minor waterway that interconnects with wetlands or other CLASS 1-3 fish habitats.
- **CLASS 4 – Unlikely key fish habitat**
  Waterway (generally unnamed) with intermittent flow following rain events only, little or no defined drainage channel, little or no flow or free standing water or pools post rain events (e.g. dry gullies or shallow floodplain depressions with no aquatic flora present).

8.6.4 Summary

Based on the above assessment, it is unlikely that the majority of mapped watercourses / drainage lines on the subject site provide functional key fish habitat. Notwithstanding this, the majority of mapped 'Key Fish Habitat' areas on the subject site will be retained with the exception of minor incursions for necessary roadways/water crossings (**FIGURE 11**). All retained waterways will be buffered in accordance with Guidelines for controlled activities

on waterfront land – Riparian Corridors (NRAR 2018) (discussed further in **SECTION 8.5.2**). These buffers should be rehabilitated to achieve fully structured native vegetation and protected in perpetuity via an environmental covenant of similar protection mechanism. These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

8.7 Goulburn Mulwaree Local Environmental Plan (2009) - *current version 19th February 2021*

8.7.1 Background

The GMLEP was made under the *Environmental Planning and Assessment Act 1979*, and among other things, relevant environment constraints are mapped for the GMLEP under the NSW planning portal and native vegetation regulatory map.

8.7.2 Applicability to the subject site

No regulated vegetation is mapped on the subject site; however, parts of the subject site are mapped as Terrestrial Biodiversity – Biodiversity under the GMLEP. As per Part 7, Section 7.2 Terrestrial biodiversity of the GMLEP, the following constraints may apply:

> *Terrestrial biodiversity*
>
> *(1) The objectives of this clause are to protect, maintain or improve the diversity of the native vegetation, including—*
>
> > *(a) protecting biological diversity of native flora and fauna, and*
> >
> > *(b) protecting the ecological processes necessary for their continued existence, and*
> >
> > *(c) encouraging the recovery of threatened species, communities or populations and their habitats.*
>
> *(2) This clause applies to development on land that is identified as "Biodiversity" on the Terrestrial Biodiversity Map.*
>
> *(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority has considered a report that addresses the following matters—*
>
> > *(a) identification of any potential adverse impact of the proposed development on any of the following—*
> >
> > > *(i) a native vegetation community,*
> > >
> > > *(ii) the habitat of any threatened species, population or ecological community,*
> > >
> > > *(iii) a regionally significant species of plant, animal or habitat,*
> > >
> > > *(iv) a habitat corridor,*
> > >
> > > *(v) a wetland,*

(vi) the biodiversity values within a reserve, including a road reserve or a stock route, and

(b) a description of any proposed measures to be undertaken to ameliorate any such potential adverse impact.

(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development is consistent with the objectives of this clause and—

(a) the development is designed, sited and managed to avoid the potential adverse environmental impact, or

(b) if a potential adverse impact cannot be avoided, the development—

(i) is designed and sited so as to have minimum adverse impact, and

(ii) incorporates effective measures so as to have minimal adverse impact, and

(iii) mitigates any residual adverse impact through the restoration of any existing disturbed or modified area on the site.

This EA demonstrates that the proposed development will not have adverse impacts on any of the items listed under Clauses (3a & 3b). In addition, and in compliance with Clauses (4a & 4b), the highest value ecological areas (i.e. VZ1 and VZ2) are proposed to be retained (and restored), buffered and protected in perpetuity (**FIGURE 11**). These measures will be fully outlined in a Covenant Management Plan (CMP) to be approved by Council as part of any future development application.

9 SUMMARY AND CONCLUSIONS

JWA Pty Ltd were previously engaged by Windellama Road Pty Ltd & GTSMF Pty Ltd to complete an ECA of a parcel of land on Mountain Ash Road, Gundary, NSW. Following the ECA, and during subsequent meetings with Council, GMC officers indicated the need for targeted field surveys to determine the presence (or likely presence) of threatened flora and fauna species and TECs / EECs, and the preparation of an EA report to development application standards.

The subject site is located ~5 km to the south, southeast of regional city of Goulburn, NSW, and is bounded entirely by a cleared and managed landscape utilised for rural residential, agricultural and/or grazing purposes. The subject site is characterised by flat to slightly undulating terrain dominated by cleared and historical managed grassland, with minimal native forest cover. There are numerous stock dams present, along with watercourses / drainage lines traversing the subject site towards Gundary Creek to the west.

It is understood that the landowner is proposing to lodge a planning proposal to rezone the land to allow for a rural residential subdivision of the subject site. The current preliminary development layout includes 108 lots that facilitate rural residential allotments and associated services and access, and environmental protection / open space areas.

A targeted threatened flora assessment recorded a total of 155 flora species were recorded at the subject site, 50% of which (i.e. 78 species) are exotic/weed species, however exotic/weed species are estimated to contribute greater than 95% of the sites biomass**.** No threatened flora species were recorded on the subject site however potentially suitable habitat, albeit highly degraded/marginal at best, was identified for the Button wrinklewort (Rutidosis leptorhynchoides) and Small purple-pea (Swainsona recta) within VZ1 and VZ2.

Most of the subject site is clear of any native vegetation and is currently grazed by sheep and comprised of fodder crops or currently disused/spelled paddocks containing a mixture of exotic/pasture grasses and common agricultural weeds. There are very few mature trees, and most native flora species are comprised of scattered grasses, sedges, rushes and forbs amongst exotic/pasture grasses within lower-lying areas of the site. A total of three (3) VZs were identified on the subject site based on different broad condition states.

VZ1 is restricted to a small patch of vegetation comprising seven (7) scattered Blakley's red gum and an exotic grassy understorey. This VZ is potentially representative of the TEC *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* listed under the EPBC Act and CEEC Box-Gum Woodland listed under the BC Act. An assessment against the relevant condition thresholds included in the National Recovery Plan determined that VZ1 does not meet the minimum condition at which the patch can be included in the listed ecological community. A referral under the EPBC Act, in this case, is **not** considered necessary.

The requirements for recognising a Box-Gum Woodland under the BC Act differ slightly to those under the EPBC Act, in that determining if an area is suitable is not determinant on the groundcover being predominately native. As a result, VZ1 is likely to be considered an

area of the CEEC Box-Gum Woodland; however, further interrogation of its conservation value determined that VZ1 is highly modified due to past clearing activities and grazing, and the conservation value is diminished. An Assessment of Significance was undertaken for VZ1, the outcome of which identified that the impacts of the proposed development would be unlikely to result in any significant impacts on the Box-Gum Woodland CEEC. Regardless, and as a precaution, VZ1 has been treated as a degraded patch of this CEEC that will be retained (and restored), buffered and protected in perpetuity in accordance with a Covenant Management Plan to be approved by Council.

VZ2 is essentially comprised of low-lying areas dominated by a mixture of exotic/pasture grasses, with scattered native grasses, sedges, rushes, and forbs. These latter areas were assessed against the relevant key diagnostic characteristics and condition thresholds included within the Approved Conservation Advice for the NTG-SEH TEC. There are no distinct patches on the subject site that satisfy the relevant key diagnostic characteristics or minimum condition thresholds of the NTG-SEH ecological community to be subject to the referral, assessment, and compliance provisions of the EPBC Act.

Based on field assessments and/or habitat suitability, 14 threatened and/or migratory species were considered possible occurrences on or near the subject site; however, seven (7) of these species are wide-ranging that are more likely to aerially traverse the subject site on occasion rather than utilise limited resources available. With this considered, suitable habitat is only realistically available for six (6) migratory species and one (1) threatened species – Australian painted snipe - on the subject site.

The highest quality habitat for all threatened and migratory fauna species is limited to low-lying areas such as dams, watercourses and drainage lines, with the remainder of the subject site being highly degraded and providing limited ecological value. Due to the proposed retention and restoration of the highest quality habitat areas (i.e. watercourses and drainage lines) no significant impacts to these species or their habitat are considered likely to occur during proposed future development. In addition, habitat occurring on the subject site is likely to be of minimal value when compared to the context of the broader locality.

The BOS Threshold test has determined that the proposed development will not trigger the relevant area clearing threshold or result in clearing within a mapped Biodiversity Values area. Assessments of significance for the degraded CEEC on site and the threatened species considered a possible occurrence have determined that significant impact is not likely. In accordance with the requirements of the BCR it is not necessary to engage an accredited assessor to apply the BAM to assess the impacts of the proposal or prepare a BDAR to accompany the development application.

A Koala Habitat assessment under the Biodiversity and Conservation SEPP 2021 (Koala Habitat Protection 2020) concluded that despite the presence of potential koala habitat, highly suitable habitat or core koala habitat is not considered to occur on the subject site.

The subject site contains three (3) main watercourses / drainage lines that are mapped as 'Key Fish Habitat' under the FM Act. An assessment using the *Policy and guidelines for fish*

habitat conservation and management (DPI 2013) determined that it is unlikely that the mapped watercourses / drainage lines on the subject site provides functional key fish habitat. Notwithstanding this, mapped areas on the subject site will be protected in perpetuity as part of the proposed development.

Under the GMLEP, parts of the subject site are mapped as Terrestrial Biodiversity – Biodiversity under which certain constraints apply. This EA demonstrates that the proposed development will not have adverse impacts on any of the items listed under the relevant clauses.

Based on the detailed findings of this EA, it can be confidently concluded that the most important environmental values by way of habitat for threatened species and ecological features is present in VZ1 and low-lying areas of VZ2. These highest value ecological areas are proposed to be retained (and restored), buffered and protected in perpetuity under a CMP to be approved by Council. With these measures considered, there is no evidence to suggest that the proposed development would have a negative impact on important habitat critical to the survival of any threatened species, ecological community or other important ecological features.

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APPENDIX 1 - PLANT SPECIES LIST

Family	Common Name	Scientific Name	Exotic
Aizoaceae	Carpet weed	*Galenia pubescens*	*
Amaranthaceae	Redroot Amaranth	*Amaranthus retroflexus*	*
Anthericaceae	Slender Wire Lily	*Laxmannia gracilis*	
Anthericaceae	Yellow Autumn-lily	*Tricoryne elatior*	
Apiaceae	Hemlock	*Conium maculatum*	*
Apiaceae	Native Carrot	*Daucus glochidiatus*	
Apiaceae	Blue Devil	*Eryngium ovinum*	
Apiaceae	Stinking Pennywort	*Hydrocotyle laxiflora*	
Asparagaceae	Asparagus	*Asparagus officinalis*	*
Asteraceae	Capeweed	*Arctotheca calendula*	*
Asteraceae	Dolly Bush	*Cassinia aculeata*	
Asteraceae	Common Everlasting	*Chrysocephalum apiculatum*	
Asteraceae	Spear Thistle	*Cirsium vulgare*	*
Asteraceae	Flaxleaf Fleabane	*Conyza bonariensis*	*
Asteraceae	Tall fleabane	*Conyza sumatrensis*	*
Asteraceae	Bear's Ear	*Cymbonotus lawsonianus*	
Asteraceae	Stinkwort	*Dittrichia graveolens*	*
Asteraceae		*Euchiton sphaericus*	
Asteraceae	Cudweed	*Gamochaeta calviceps*	*
Asteraceae	Purple Cudweed	*Gamochaeta purpurea*	*
Asteraceae	Smooth Catsear	*Hypochaeris glabra*	*
Asteraceae	Catsear	*Hypochaeris radicata*	*
Asteraceae	Prickly Lettuce	*Lactuca serriola*	*
Asteraceae	Scotch Thistle	*Onopordum acanthium subsp. acanthium*	*
Asteraceae	Ragwort	*Senecio jacobaea*	*
Asteraceae		*Solenogyne dominii*	
Asteraceae	Common Sowthistle	*Sonchus oleraceus*	*
Asteraceae	Dandelion	*Taraxacum officinale*	*
Asteraceae	Yellow Hawkweed	*Tolpis barbata*	*
Asteraceae	Common Sunray	*Triptilodiscus pygmaeus*	
Asteraceae		*Vittadinia muelleri*	
Boraginaceae	Patterson's Curse	*Echium plantagineum*	*
Boraginaceae		*Hackelia suaveolens*	

Family	Common Name	Scientific Name	Exotic
Brassicaceae	Canola	*Brassica napus*	*
Brassicaceae	Shepherd's Purse	*Capsella bursa-pastoris*	*
Brassicaceae	Buchan Weed	*Hirschfeldia incana*	*
Brassicaceae	Common Peppercress	*Lepidium africanum*	*
Brassicaceae	Yellow Cress	*Rorippa palustris*	*
Brassicaceae	Hedge Mustard	*Sisymbrium officinale*	*
Campanulaceae		*Lobelia surrepens*	
Campanulaceae	Tufted Bluebell	*Wahlenbergia communis*	
Caryophyllaceae	Proliferous Pink	*Petrorhagia nanteuilii*	*
Caryophyllaceae	Sandspurry	*Spergularia rubra*	*
Caryophyllaceae	Prickly Starwort	*Stellaria pungens*	
Chenopodiaceae	Fat Hen	*Chenopodium album*	*
Chenopodiaceae	Climbing Saltbush	*Einadia nutans*	
Clusiaceae	Small St John's Wort	*Hypericum gramineum*	
Clusiaceae	St. Johns Wort	*Hypericum perforatum*	*
Convolvulaceae		*Convolvulus angustissimus*	
Convolvulaceae	Kidney Weed	*Dichondra repens*	
Cupressaceae	Juniper	*Juniperus spp.*	*
Cyperaceae	Tall Sedge	*Carex appressa*	
Cyperaceae	Umbrella Sedge	*Cyperus eragrostis*	*
Cyperaceae		*Eleocharis acuta*	
Cyperaceae	Nodding Club-rush	*Isolepis cernua*	
Cyperaceae		*Lepidosperma gunnii*	
Cyperaceae	Variable Sword-sedge	*Lepidosperma laterale*	
Cyperaceae	Fluke Bogrush	*Schoenus apogon*	
Dipsacaceae	Wild Teazle	*Dipsacus fullonum subsp. fullonum*	*
Fabaceae (Faboideae)	Bitter-pea	*Daviesia latifolia*	
Fabaceae (Faboideae)	Slender Tick-trefoil	*Desmodium varians*	
Fabaceae (Faboideae)	Twining glycine	*Glycine clandestina*	
Fabaceae (Faboideae)	Variable Glycine	*Glycine tabacina*	
Fabaceae (Faboideae)	False Sarsaparilla	*Hardenbergia violacea*	
Fabaceae (Faboideae)	Burr Medic	*Medicago polymorpha*	*

Family	Common Name	Scientific Name	Exotic
Fabaceae (Faboideae)	Lucerne	*Medicago sativa*	*
Fabaceae (Faboideae)	Narrow-leaved Clover	*Trifolium angustifolium*	*
Fabaceae (Faboideae)	Haresfoot Clover	*Trifolium arvense*	*
Fabaceae (Faboideae)	Gorse	*Ulex europaeus*	*
Fabaceae (Mimosoideae)	Black Wattle	*Acacia decurrens*	
Fabaceae (Mimosoideae)	Early Wattle	*Acacia genistifolia*	
Gentianaceae	Common Centaury	*Centaurium erythraea*	*
Geraniaceae	Common Crowfoot	*Erodium cicutarium*	*
Goodeniaceae	Scrambles Eggs	*Goodenia pinnatifida*	
Goodeniaceae		*Velleia paradoxa*	
Haloragaceae	Variable Raspwort	*Haloragis heterophylla*	
Iridaceae	Onion Grass	*Romulea rosea var. australis*	*
Juncaceae	Toad Rush	*Juncus bufonius*	*
Juncaceae		*Juncus usitatus*	
Lomandraceae	Wattle Matt-rush	*Lomandra filiformis subsp. coriacea*	
Lomandraceae	Spiny-headed Mat-rush	*Lomandra longifolia*	
Lomandraceae	Many-flowered Mat-rush	*Lomandra multiflora subsp. multiflora*	
Lythraceae	Hyssop Loosestrife	*Lythrum hyssopifolia*	
Malaceae	Hawthorn	*Crataegus monogyna*	*
Malvaceae	Red-flowered Mallow	*Modiola caroliniana*	*
Myrtaceae	Blakely's Red Gum	*Eucalyptus blakelyi*	
Oleaceae	Large-leaved Privet	*Ligustrum lucidum*	*
Oleaceae	Small-leaved Privet	*Ligustrum sinense*	*
Oxalidaceae	Creeping Oxalis	*Oxalis corniculata*	*
Oxalidaceae		*Oxalis perennans*	
Phormiaceae	Blueberry Lily	*Dianella longifolia*	
Phormiaceae	Blueberry Lily	*Dianella revoluta*	
Phormiaceae		*Dianella revoluta var. revoluta*	
Pinaceae	Radiata Pine	*Pinus radiata*	*
Pinaceae		*Pinus spp.*	*
Plantaginaceae	Buck's-horn Plaintain	*Plantago coronopus*	*

Family	Common Name	Scientific Name	Exotic
Plantaginaceae	Lamb's Tongues	*Plantago lanceolata*	*
Plantaginaceae		*Plantago varia*	
Poaceae	Wheatgrass, Common Wheatgrass	*Anthosachne scabra*	
Poaceae	Purple Wiregrass	*Aristida ramosa*	
Poaceae	Yanganbil	*Austrostipa bigeniculata*	
Poaceae	Foxtail Speargrass	*Austrostipa densiflora*	
Poaceae	Speargrass	*Austrostipa scabra*	
Poaceae	Rough Speargrass	*Austrostipa scabra subsp. falcata*	
Poaceae	Oats	*Avena spp.*	*
Poaceae	Red Grass	*Bothriochloa macra*	
Poaceae	Quaking Grass	*Briza maxima*	*
Poaceae	Shivery Grass	*Briza minor*	*
Poaceae	Soft Brome	*Bromus molliformis*	*
Poaceae	Kikuyu Grass	*Cenchrus clandestinus*	*
Poaceae	Windmill grass	*Chloris truncata*	
Poaceae	Common Couch	*Cynodon dactylon*	
Poaceae	Cocksfoot	*Dactylis glomerata*	*
Poaceae		*Dichelachne spp.*	
Poaceae	Wiry Panic	*Entolasia stricta*	
Poaceae	African Lovegrass	*Eragrostis curvula*	*
Poaceae	Weeping Lovegrass	*Eragrostis parviflora*	
Poaceae	Tall fescue	*Festuca arundinacea*	*
Poaceae	Matgrass	*Hemarthria uncinata*	
Poaceae	Yorkshire Fog	*Holcus lanatus*	*
Poaceae	Barley Grass	*Hordeum leporinum*	*
Poaceae	Perennial Ryegrass	*Lolium perenne*	*
Poaceae	Wimmera ryegrass	*Lolium rigidum*	*
Poaceae	Weeping Grass	*Microlaena stipoides*	
Poaceae	Weeping Grass	*Microlaena stipoides*	
Poaceae	Chilean Needle Grass	*Nassella neesiana*	*
Poaceae	Serrated Tussock	*Nassella trichotoma*	*
Poaceae	Hairy Panic	*Panicum effusum*	
Poaceae	Paspalum	*Paspalum dilatatum*	*
Poaceae	Water Couch	*Paspalum distichum*	
Poaceae	Harding grass	*Phalaris aquatica*	*

Family	Common Name	Scientific Name	Exotic
Poaceae	Bulbous Poa	*Poa bulbosa*	*
Poaceae	Tussock	*Poa labillardierei var. labillardierei*	
Poaceae	Annual Beardgrass	*Polypogon monspeliensis*	*
Poaceae	Wallaby Grass	*Rytidosperma pallidum*	
Poaceae		*Rytidosperma spp.*	
Poaceae	Pale Pigeon Grass	*Setaria pumila*	*
Poaceae	Wall Fescue	*Vulpia muralis*	*
Poaceae	Rat's-tail Fescue	*Vulpia spp.*	*
Polygonaceae	Sheep Sorrel	*Acetosella vulgaris*	*
Polygonaceae	Creeping Knotweed	*Persicaria prostrata*	
Polygonaceae	Swamp Dock	*Rumex brownii*	
Polygonaceae	Curled Dock	*Rumex crispus*	*
Pteridaceae	Rock Fern	*Cheilanthes sieberi*	
Pteridaceae	Cloak Fern, Mulga Fern, Rock Fern	*Cheilanthes spp.*	
Ranunculaceae	Large River Buttercup	*Ranunculus papulentus*	
Rosaceae	Acaena	*Acaena ovina*	
Rosaceae	Blackberry complex	*Rubus fruticosus sp. agg.*	*
Rubiaceae	Common Woodruff	*Asperula conferta*	
Rubiaceae	Rough Bedstraw	*Galium gaudichaudii*	
Rubiaceae	Pomax	*Pomax umbellata*	
Solanaceae	African Boxthorn	*Lycium ferocissimum*	*
Solanaceae	Black-berry Nightshade	*Solanum nigrum*	*
Thymelaeaceae	Rice Flower	*Pimelea curviflora*	
Typhaceae	Narrow-leaved Cumbungi	*Typha domingensis*	

APPENDIX 2 – RAW PLOT DATA (20 M X 20 M) FOR DETERMINATION OF POTENTIAL NTG-SEH TEC

Notes

- **Indicator species** from http://www.environment.gov.au/biodiversity/threatened/communities/pubs/152-indicator-species-list.pdf
- **Significance Species Rating** (Rehwinkel 2005) available at: https://www.gbwcmn.net.au/sites/default/files/GrasslandAssessmentMethod_0.pdf
- **FSC Methodology** (Rehwinkel 2015) available at: https://www.fog.org.au/Articles/2014%20forum/Rehwinkel,%20Revised%20Floristic%20Value%20Scoring%20Method%20for%20grassland%20condition.pdf

Plot 1

Species	Common name	Native (N) / Exotic (E)	Indicator species	Percentage cover (%)	Cover-Abundance Score	Species significance rating	Weighted value (proportion of FVS)
Plot 1							
*Eragrostis curvula**	African lovegrass	E	-	30	5		
*Phalaris aquatica**	Harding grass	E	-	30	5		
*Nassella trichotoma**	Serrated tussock	E	-	10	4		
Eragrostis parviflora	Weeping lovegrass	N	N	10	4	C	0.30
Cynodon dactylon	Common couch	N	N	7	4	C	0.30
*Plantago spp.**	Plantain	E	-	5	4		
*Taraxacum officinale**	Dandelion	E	-	1	2		
*Onopordum acanthium**	Scotch thistle	E	-	1	2		
*Brassica napus**	Canola	E	-	0.5	1		
Key diagnostic characteristics							
Percentage cover (%) of native species				17			
Percentage cover (%) of exotic species				77.5			
Condition Assessment							
No. of non-grass native species				0			
No. of indicator species				0			
Floristic value score (FVS)				0.60			

Plot 2

Species	Common name	Native (N) / Exotic (E)	Indicator species	Percentage cover (%)	Cover-Abundance Score	Species significance rating	Weighted value (proportion of FVS)
Plot 2							
*Nassella trichotoma**	Serrated tussock	E	-	30	5		
*Phalaris aquatica**	Harding grass	E	-	20	4		
*Festuca arundinacea**	Tall fescue	E	-	15	4		
Anthosachne scabra	Common wheat grass	N	N	10	4	C	0.30
Bothriochloa macra	Red grass	N	N	5	4	C	0.30
*Onopordum acanthium**	Scotch thistle	E	-	5	4		
Lobelia surrepens		N	N	5	4	C	0.30
Isolepis cernua	Nodding club rush	N	N	2	2	C	0.12
Chrysocephalum apiculatum	Common Everlasting	N	Y	1	1		
*Conyza sumatrensis**	Tall fleabane	E	-	1	1		
Key diagnostic characteristics							
Percentage cover (%) of native species				23			
Percentage cover (%) of exotic species				72			
Condition Assessment							
No. of non-grass native species				3			
No. of indicator species				1			
Floristic value score				1.02			

Plot 3

Species	Common name	Native (N) / Exotic (E)	Indicator species	Percentage cover (%)	Cover-Abundance Score	Species significance rating	Weighted value (proportion of FVS)
Plot 3							
*Phalaris aquatica**	Harding grass	E	-	60	6		
Carex appressa	Tall sedge	N	N	15	4	C	.30
Juncus usitatus		N	N	5	4	C	.30
Avena spp.	Oats	E	-	5	4		
*Galenia pubescens**	Carpet weed	E	-	2	3		
Cynodon dactylon	Common couch	N	N	2	3	C	.30
Lobelia surrepens		N	N	1	2	C	.30
*Onopordum acanthium**	Scotch thistle	E	-	1	2		
*Taraxacum officinale**	Dandelion	E	-	1	2		
*Brassica napus**	Canola	E	-	0.5			
*Oxalis corniculata**	Creeping Oxalis	E	-	0.5			
Key diagnostic characteristics							
Percentage cover (%) of native species				23			
Percentage cover (%) of exotic species				70			
Condition Assessment							
No. of non-grass native species				2			
No. of indicator species				0			
Floristic value score				1.20			

Plot 4

Species	Common name	Native (N) / Exotic (E)	Indicator species	Percentage cover (%)	Cover-Abundance Score	Species significance rating	Weighted value (proportion of FVS)
Plot 4							
*Paspalum dilatatum**	Paspalum	E	-	40	5		
*Eragrostis curvula**	African lovegrass	E	-	30	5		
Chloris truncata	Windmill grass	N	N	10	4	C	0.3
*Phalaris aquatica**	Harding grass	E	-	10	4		
*Rubus fruticosus**	Blackberry	E	-	5	4		
*Taraxacum officinale**	Dandelion	E	-	1	2		
*Rumex crispus**	Curled dock	E	-	1	1		
*Onopordum acanthium**	Scotch thistle	E	-	1	2		
*Oxalis corniculata**	Creeping Oxalis	E	-	0.5	1		
Key diagnostic characteristics							
Percentage cover (%) of native species				10			
Percentage cover (%) of exotic species				88.5			
Condition Assessment							
No. of non-grass native species				0			
No. of indicator species				0			
Floristic value score				0.3			

APPENDIX 3 - HABITAT SUITABILITY ASSESSMENTS

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
Amphibians					
Litoria aurea	Green and gold bell frog	E	V	**Unlikely**	The green and golden bell frog has been found in a wide range of water bodies except fast flowing streams. The species can also inhabit highly disturbed sites. Breeding habitat in NSW includes water bodies that are still, shallow, ephemeral, unpolluted, unshaded, with aquatic plants and free of Mosquito Fish (*Gambusia holbrooki*) and other predatory fish. Typically breeding habitat is associated with bullrushes (*Typha spp*.) or spikerushes (*Eleocharis spp.*), and with terrestrial habitats that consisted of grassy areas and vegetation no higher than woodlands.
Birds					
Anthochaera phrygia	Regent honeyeater	**CE**	CE	**Unlikely**	The regent honeyeater is found from Dalby in Queensland, south to Bendigo in Victoria, especially along the ranges and the western slopes. Its distribution is extremely patchy with only a small number of known breeding sites. The estimated total population is between 350 and 400 mature individuals. Potential habitat for this species includes dry eucalypt woodland and open forest, rural and urban areas with mature eucalypts. It favours ironbark-box associations, mugga ironbark (*Eucalyptus sideroxylon*), white box (*E. albens*), and yellow box (E*. melliodora*). Other habitat includes swamp mahogany (*E. robusta*), spotted gum (*Corymbia maculata*), or river she-oak (*Casuarina cunninghamiana*) with associated needle-leaf mistletoe (*Amyema cambagei*). This species generally prefers wetter, more fertile sites that are reliable nectar producers (both in timing and quantity), such as creek flats, river valleys and lower slopes (OEH 2014).

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
Apus pacificus	Fork-tailed swift	-	M	**Possible**	This is a primarily aerial species, usually occurring above dry or open habitats, but also occasionally above rainforest and wet sclerophyll forests. They have been recorded above settled areas such as farmlands, towns, and cities.
Adrea alba	Great egret	-	M	**Possible**	This species inhabits a wide range of wetland habitats, including swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt pans and salt lakes; salt marshes; estuarine mudflats, tidal streams; mangrove swamps; coastal lagoons; and offshore reefs. This species usually frequents shallow waters.
Ardea ibis	Cattle egret	-	M	**Possible**	This species inhabits tropical and temperate grasslands, wooded lands, and terrestrial wetlands. It uses predominately shallow, open, and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora. This species often forages away from water on low lying grasslands, improved pastures, and croplands. It is commonly found in cattle fields and other farm areas that contain livestock. This species roosts in trees or amongst ground vegetation in or near lakes and swamps.
Botaurus poiciloptilus	Australasian bittern	**E**	E	**Unlikely**	Favours wetlands with tall, dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. The species favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and/or reeds (e.g. *Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus*) or cutting grass (*Gahnia*) growing over muddy or peaty substrate

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
Callocephalon fimbiatum	Gang-gang cockatoo	**V**	E	**Unlikely**	The Gang-gang cockatoo favours old growth forest and woodland attributes for nesting and roosting. Nests are in hollows that are 10 cm in diameter or larger in eucalypts. In spring and summer, there species is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.
Calidris acuminata	Sharp-tailed sandpiper	**-**	M	**Unlikely**	The Sharp-tailed Sandpiper prefers the grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Its breeding habitat in Siberia is the peat-hummock and lichen tundra of the high Arctic.
Calidris ferruginea	Curlew sandpiper	**E**	CE	**Unlikely**	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.
Calyptorhynchus lathami	Glossy black-cockatoo	**V**	-	**Unlikely**	This species is associated with woodland or open sclerophyll forests with populations of *Allocasuarina*, which comprise its exclusive diet. They require large old trees with hollows for nesting.
Daphoenositta chrysoptera	Varied sittella	V	V	**Unlikely**	Found across most of Australia, excluding treeless deserts and open grasslands. Habitat preferences include eucalyptus forests and woodlands, in particular containing mature gums with dead branches, mallee, and Acacia woodland.

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
Falco hypoleucos	Grey falcon	E	V	**Possible**	This species is associated with arid or semi-arid environments, where it can be found in shrublands, grasslands, watercourses, and wetlands.
Falco subniger	Black falcon	V	-	**Possible**	The black falcon is widely distributed and can travel hundreds of kilometres. The species may traverse over the subject site; however, the loss of large old trees is a primary threat due to a loss of nesting and hunting platforms.
Gallinago hardwickii	Latham's snipe	-	M	**Possible**	This species generally occupies flooded meadows, seasonal or semi-permanent swamps, or open waters bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. Dense fringing vegetation is preferred by this species, but it has been recorded in waterlogged paddocks.
Grantiella picta	Painted honeyeater	V	V	**Unlikely**	This species inhabits Boree/Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. It is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. They nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark, or mistletoe branches.
Haliaeetus leucogaster	White-bellied sea-eagle	V	M	**Unlikely**	This species has a large distribution range throughout Southeast Queensland, and is found in association with coasts, large rivers and estuaries and prefers to nest in large trees adjacent watercourses.
Hieraaetus morphnoides	Little eagle	V	-	**Possible**	Found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. Occupies open eucalypt forest, woodland, open woodland, She oak or Acacia woodlands, and riparian woodlands of interior NSW. The subject site does not provide suitable nesting habitat but may be traversed by this species will foraging.

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
Hirundapus caudacutus	White-throated needletail	-	V, M	**Possible**	This species is recorded in all coastal regions of Queensland and New South Wales and almost always forages aerially. Most often, the species is recorded above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland.
Lathamus discolor	Swift parrot	**E**	CE	**Unlikely**	The swift parrot migrates from its Tasmanian breeding grounds to overwinter in the box-ironbark forests and woodlands of Victoria, New South Wales, and southern Queensland.
Merops ornatus	Rainbow bee-eater	-	M	**Possible**	This species occurs in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. Usually occurs in open, cleared or lightly timbered areas that are often, but not always, located in close proximity to permanent water. Also occurs in inland and coastal sand dune systems, and in mangroves.
Monarcha melanopsis	Black-faced monarch	-	M	**Unlikely**	This species occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest. During winter or migration, this species also occurs in marginal habitats such as 20-30 years old regrowth rainforest, nearby open eucalypt forest (mainly wet sclerophyll forests), especially in gullies with a dense, shrubby understorey as well as dry sclerophyll forests and woodlands, often with a patchy understorey.
Motacilla flava	Yellow wagtail	**-**	M	**Unlikely**	Inhabits open country near water, such as wet meadows. It nests in tussocks.

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
Myiagra cyanoleuca	Satin flycatcher	-	M	**Unlikely**	This species occurs in heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occurs in coastal forests, woodlands, mangroves and drier woodland and open forests.
Numenius madagascariensis	Eastern curlew	-	CE	**Unlikely**	It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts.
Pandion cristatus	Eastern osprey	V	M	**Unlikely**	This species is found in littoral and coastal habitats, occasionally following large watercourses inland. It requires extensive open areas of water for foraging.
Petroica boodang	Scarlet robin	V	-	**Unlikely**	Prefers dry eucalypt forests and woodlands with an understorey that is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. An important component of the species habitat is abundant logs and fallen timber.
Polytelis swainsonii	Superb parrot	V	V	**Possible**	Nest in the hollows of large trees (dead or alive) in tall riparian River Red Gum Forest or Woodland and can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. May forage up to 10 km from nesting sites, primarily in grassy box woodland.
Pycnoptilus floccosus	Pilotbird	-	V	**Unlikely**	Pilotbirds are strictly terrestrial, living on the ground in dense forests with heavy undergrowth. Habitat considered critical to the pilotbirds survival includes; (i) wet sclerophyll forests in temperate zones in moist gullies with dense undergrowth, and (ii) dry sclerophyll forests and woodlands occupying dry slopes and ridges.
Rhipidura rufifrons	Rufous fantail	-	M	**Unlikely**	In east and south-east Australia, the rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
					tallowwood (*Eucalyptus microcorys*), mountain grey gum (*E. cypellocarpa*), narrow-leaved peppermint (*E. radiata*), mountain ash (*E. regnans*), alpine ash (*E. delegatensis*), blackbutt (*E. pilularis*) or red mahogany (*E. resinifera*); usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests; for example near Bega in south-east New South Wales, where they are recorded in temperate lilly pilly (*Acmena smithi*) rainforest, with grey myrtle (*Backhousia myrtifolia*), sassafras (*Doryphora sassafras*) and sweet pittosporum (*Pittosporum undulatum*) subdominants. They occasionally occur in secondary regrowth, following logging or disturbance in forests or rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including spotted gum (*Eucalyptus maculata*), yellow box (*E. melliodora*), ironbarks or stringybarks, often with a shrubby or heath understorey. In north and north-east Australia, they often occur in tropical rainforest and monsoon rainforests, including semi-evergreen mesophyll vine forests, semi-deciduous vine thickets or thickets of *Melaleuca* spp.
Rostratula australis	Australian painted snipe	**E**	E	**Possible**	This species inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps, and clay pans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum *Muehlenbeckia* or canegrass or sometimes tea-tree (*Melaleuca*). Breeding habitat requirements appear to be specific and includes shallow wetlands with areas of bare wet mud, with both upper and canopy cover nearby. Nest records are predominately from or near small islands in freshwater wetlands, provided that these

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
					islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover.
Invertebrates					
Keyacris scurra	Key's matchstick grasshopper	**-**	E	**Unlikely**	Usually found in native grasslands but it has also been recorded in other vegetation associations containing a native grass understory (especially kangaroo grass *Themeda triandra*) and known food plants (particularly Asteraceae). Tall native grassland (usually Themeda) with native daisies (or other food sources) is the habitat that most historical records are associated with and such habitat has been widely grazed, cleared, modified and/or burned throughout its original range.
Synemon plana	Golden sun moth	V	**E**	**Unlikely**	The Golden sun moth occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses *Austrodanthonia spp*. Grasslands dominated by wallaby grasses are typically low and open - the bare ground between the tussocks is thought to be an important microhabitat feature, as it is typically these areas on which the females are observed displaying to attract males. Habitat may contain several wallaby grass species, which are typically associated with other grasses particularly spear-grasses *Austrostipa spp*. or Kangaroo Grass *Themeda australis*.
Mammals					
Chalinolobus dwyeri	Large-eared pied bat	**V**	V	**Unlikely**	This species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors that are used for foraging. Almost all records have been found within several kilometres of cliff lines or rocky terrain. Roosting has also been observed in disused mine shafts, caves, overhangs, and disused fairy martin (*Hirundo ariel*) nests. The structure of primary nursery roosts

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
					appears to be very specific, *i.e.* arch caves with dome roofs (that need to be deep enough to allow juvenile bats to learn to fly safely inside) and with indentations in the roof (presumably to allow the capture of heat). These physical characteristics are very uncommon in the landscape and therefore a limiting factor to the species distribution.
Dasyurus maculatus maculatus (SE mainland population)	Spotted-tail quoll	V	E	**Unlikely**	This species is recorded from a wide range of habitats, including montane rainforests, sclerophyll forests (*e.g.* open, closed, wet), coastal heathlands, sub-alpine woodlands, and riparian forests. It prefers mature wet forests that have not been logged and require large areas of relatively intact forest for foraging. Preferred den sites include hollow logs, caves, or rocky outcrops for daytime shelter.
Falsistrellus tasmaniensis	Eastern false pipistrelle	V	**-**	**Unlikely**	This species prefers moist habitats with trees taller than 20 m. Roosts are generally found in eucalypt hollows, but has also been found under loose bark on trees or in buildings.
Micronomus norfolkensis	Eastern coastal free-tailed bat	V	**-**	**Unlikely**	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.
Miniopterus australis	Little bent-winged bat	V	**-**	**Unlikely**	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas.
Nyctophilus corbeni	Corben's long-eared bat	**V**	V	**Unlikely**	Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts are found in tree hollows, crevices, and under loose bark.
Petauroides volans	Greater glider	**-**	V	**Unlikely**	This species is found in eucalypt forests and woodlands. It prefers forests with a good diversity of eucalypt species to provide consistent

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
					forage opportunities year-round, and is found in the greatest abundance in tall, montane, moist old growth forests.
Petaurus australis	Yellow-bellied glider	V	V	**Unlikely**	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.
Petrogale penicillata	Brush-tailed rock-wallaby		V	**Unlikely**	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north.
Phascolarctos cinereus	Koala	V	V	**Unlikely**	This species inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities where suitable food trees are present. The koala is a leaf-eating specialist that feeds primarily during dawn, dusk, or night. Its diet is restricted mainly to foliage of a small selection of preferred *Eucalyptus* spp; however, it may also consume foliage of related genera, including *Corymbia* spp., *Angophora* spp., *Melaleuca* spp., and *Lophostemon* spp.
Pseudomys novaehollandiae	New Holland mouse	**E**	V	**Unlikely**	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes
Pteropus poliocephalus	Grey-headed flying-fox	V	V	**Possible**	This species occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops. This species feeds on the nectar and pollen of native trees, in particular *Eucalyptus*, *Melaleuca* and *Banksia*, and fruits of rainforest trees and vines. It also feeds on commercial fruit crops and on introduced tree species in urban areas. The grey-headed flying-fox roosts in aggregations of various sizes on exposed branches. Roost sites are generally located within 20 km of a regular food source and are typically located near water, such as lakes, rivers, or the coast. Roost vegetation includes rainforest patches, stands of *Melaleuca*, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban

Scientific name	Common name	BC Act*	EPBC Act#	Likelihood of occurrence	Habitat assessment[1]
					areas. The species can maintain fidelity to roost sites for extended periods, although new sites have been colonized.
Saccolaimus flaviventris	Yellow-bellied sheathtail bat	V	-	**Unlikely**	The Yellow-bellied sheathtail-bat roost singly or in groups of up to six, in tree hollows and buildings. Forages for insects over the forest canopy, but lower in more open country. Forages in most habitats across its wide range, with and without trees.
Reptiles					
Aprasia parapulchella	Pink-tailed worm-lizard	V	V	**Unlikely**	This species prefers sloping, open woodland areas that are well drained and contain rock outcrops. Some of the main identified threats to this species includes habitat loss and fragmentation, habitat degradation (including rock removal and stock grazing), and predation by cats and foxes.
Delma impar	Striped legless lizard	V	V	**Unlikely**	Is known to occur in the area and is a grassland specialist. All occupied sites have or had a grassy groundcover, often mixed with native and exotic perennial and annual species. The species has been recorded sheltering in grass tussocks, think ground cover, soil cracks, under rocks or timber, or in spider burrows.

* *NSW Biodiversity Conservation Act 2016* (BC Act)

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act)

CE – Critically Endangered, E – Endangered, V – Vulnerable, M – Migratory (marine, terrestrial or listed)

() listed but not found in site database search.

[1] Sources (including specific literature references) from:

- DAWE (2022) *Species Profile and Threats Database*. Department of Agriculture, Water and the Environment (DAWE). Australian Government. Available at http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.
- DES (2022). *Species Profile Search*. Department of Environment and Science (DES), Queensland Government.
- DoPIE (2022). *Threatened biodiversity profile search*. Office of Environment and Heritage, Department of Planning, Industry and Environment (DoPIE), New South Wales Government.

APPENDIX 4 – ASSESSMENTS OF SIGNIFICANCE (5-PART TEST)

Endangered Ecological Communities (EECs)

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Box-Gum Woodland)

(a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable to EECs.

(b) In the case of an endangered ecological community or critically endangered ecological community whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

According to the Threatened Species Test of Significance Guidelines (OEH 2018), the local occurrence of a community is defined as:

> *"the ecological community that occurs within the study area. However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated."*

VZ1 is considered satisfactory in the key characteristics to potentially represent the CEEC Box-Gum Woodland; however, given historical clearing and grazing, the overall condition of this VZ is considered low.

Notwithstanding this, VZ1 accounts for approximately 0.38 ha on the subject site and is part of a larger patch of approximately 10 ha that extends to adjoining properties to the north-northeast. There are also other small, degraded patches of this CEEC on adjoining land to the east. The patch of VZ1 on the subject site will be retained, restored, and protected in perpetuity**,** and as a result the proposed development. Vegetated buffers are also proposed to be implemented where patches of this CEEC occur on adjoining properties. The proposed development is considered highly unlikely to place the local occurrence of this CEEC at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Based on historical clearing and grazing, the condition and composition of VZ1 (Box-Gum Woodland) has been severely compromised and subsequently invaded by numerous weeds/exotic pasture grass species (see discussion of VZ1 in **SECTION 3.3.2**). Consequently, VZ1 is highly modified and the conservation value of the potential CEEC is

diminished. Regardless, as a precautionary approach, VZ1 has been treated as a degraded patch of this CEEC and will be retained and restored as part of the proposed development. As a result, the proposed development is highly unlikely to adversely modify the composition of the local occurrence of this community to the point that it is placed at risk of extinction.

(c) In relation to the habitat of a threatened species or ecological community:

- *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

Proposed clearing activities are not considered to represent further removal or modification of habitat for this CEEC.

- *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

Native vegetation on the site is already fragmented and has a history of disturbance from past land clearing and grazing. The proposed development is unlikely to contribute significantly to an increase in the fragmentation of native vegetation communities. The only remaining native overstorey trees (i.e. Blakely's Red Gum) will be retained as part of VZ1.

- *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

The importance of disturbed areas of mainly exotic/pasture grasslands to be removed are minor when compared to the more intact areas with greater conservation significance being retained on the subject site (i.e. VZ1 and lower-lying areas of VZ2) and within the broader locality. The assessment of the importance of the habitat to be removed has taken into consideration the stages of relevant flora and fauna life cycles and how reproductive success may be affected. It is considered that the removal of the vegetation will not significantly affect the life cycle or reproductive success of native flora and fauna species or ecological communities in the locality.

(d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

There will be no adverse effects on any of the critical habitats listed under the *Biodiversity Conservation Act (2016)* from the action proposed.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to increase the impact of a key threatening process.

An assessment of the proposed development against the Key Threatening Processes (KTP) listed in Schedule 4 of the BC Act (2016) has been completed (**APPENDIX 5**). It is considered that the proposed development is unlikely to result in the exacerbation of any KTP's to the point where threatened ecological communities are likely to be significantly impacted.

Threatened flora species

(a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Button wrinklewort (Rutidosis leptorhynchoides)

Extent of the local population

The BioNet database contained 18 records of this species within 10 kilometres of the subject site.

This species was not recorded from the subject site however potentially suitable habitat is considered to occur within the less disturbed/grazed areas of the site i.e. VZ1 and VZ2. This species is also known to occur within the Gundary Traveling Stock Route which occurs immediately to the south-west of the subject site.

The local population of this species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.

Stages of the life-cycle affected by the proposed development

The Button wrinklewort is a perennial, multi-stemmed herb that occurs in Box-Gum Woodland, secondary grassland derived from Box-Gum Woodland or in Natural Temperate Grassland, and often in the ecotone between the two communities. Populations are known from Goulburn, the Canberra - Queanbeyan area and at Michelago. Other populations occur in Victoria.

The species grows on soils that are usually shallow, stony red-brown clay loams and tends to occupy areas where there is relatively less competition from herbaceous species (either due to the shallow nature of the soils, or at some sites due to the competitive effect of woodland trees).

Button wrinklewort normally flowers between December to March and plants do not usually flower until their second year. The species is thought to be insect pollinated, although the specific vectors are not known. It is Apparently susceptible to grazing, being retained in only a small number of populations on roadsides, rail reserves and other un-grazed or very lightly grazed sites.

The OEH Threatened Species Unit discusses the following threats for the Button wrinklewort:

- Loss, degradation and fragmentation of habitat and/or populations for residential and other developments.
- Loss and degradation of habitat and/or populations by intensification of grazing regimes.
- Loss and degradation of habitat and/or populations by invasion of weeds.

- Increased competition from other native grassland species within the habitat because of adverse increases of biomass due to absence of fire or grazing and the resultant closing up of the inter-tussock spaces that this species requires.
- Research by CSIRO has shown that related individuals are unable to cross pollinate. Thus, smaller populations, particularly those of less than 200 plants can be threatened in the long term due to reduced genetic diversity within the population and a resulting reduction in seed production.
- Loss and degradation of habitat and/or populations from rail reserve maintenance and road works (particularly widening or rerouting roads).
- Inherent risk of loss of small populations from natural or un-natural catastrophic events.
- Physical damage from BMX users and horse riders creating tracks.
- Competition from native trees that will shade the species.
- Rabbits are a threat to at least one population.
- Although kangaroos do not consume this species, a high density of kangaroos at Queanbeyan Nature Reserve is likely to change the species composition of the native groundcover. Kangaroos are also likely to trample young seedlings.

This species has not been recorded from the subject site. The proposed development will result in the loss of a small amount (0.18 ha / 2.3%) of potentially suitable habitat for this species. With implementation of recommended amelioration measures, the proposed development is not considered likely to result in an indirect impacts on adjoining habitat within the Gundary Travelling Stock Route.

Likelihood of local extinction

It is considered unlikely that the proposed development would lead to the extinction of the local population of this species.

Small purple-pea (Swainsona recta)

Extent of the local population

The BioNet database contained no records of this species within 10 kilometres of the subject site.

This species was not recorded from the subject site however potentially suitable habitat is considered to occur within the less disturbed/grazed areas of the site i.e. VZ1 and VZ2.

The local population of this species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.

Stages of the life-cycle affected by the proposed development

The Small purple-pea is a slender, erect perennial herb that occurs in association with understorey dominants that include Kangaroo grass (*Themeda australis*), Poa tussocks (*Poa* spp.) and Spear-grasses (*Austrostipa* spp). Before European settlement Small purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's red gum (*Eucalyptus blakelyi*), Yellow box (*E. melliodora*), Candlebark gum (*E. rubida*) and Long-leaf box (*E. goniocalyx*).

Small purple-pea was recorded historically from places such as Carcoar, Culcairn and Wagga Wagga where it is probably now extinct. Populations still exist in the Queanbeyan and Wellington-Mudgee areas. Over 80% of the southern population grows on a railway easement. It is also known from the ACT and a single population of four plants near Chiltern in Victoria.

Plants die back in summer, surviving as a rootstocks until they shoot again in autumn. The species flowers throughout spring, with a peak in October with seeds ripening at the end of the year. Individual plants have been known to live for up to 20 years.

The OEH Threatened Species Unit discusses the following threats for the Small purple-pea:

- Grazing and trampling by cattle, sheep and goats.
- Loss, degradation and fragmentation of habitat and/or populations for residential and agricultural developments.
- Loss and degradation of habitat and/or populations by weed invasion, including exotic grasses mostly, as well as bridal creeper and St John's wort.
- Increased competition from other native grassland species within the habitat because of reduced fire frequency.
- Increased competition from black cypress pine (Callitris endlicheri) within the habitat possibly because of exclusion of fire from some northern sites.
- Loss and degradation of habitat and/or populations from inappropriate rail reserve maintenance.
- Inherent risk of loss of small populations from natural or un-natural catastrophic events.
- Accidental damage at some sites from recreational vehicles such as 4WDs and trail bikes.
- Construction of inappropriate hazard reduction control lines.
- Erosion of some railway embankments is causing the direct loss of habitat and individual plants
- Feral pigs have seriously impacted on one population near Williamsdale

This species has not been recorded from the subject site. The proposed development will result in the loss of a small amount (0.18 ha / 2.3%) of potentially suitable habitat for this species. With implementation of recommended amelioration measures, the proposed

development is not considered likely to result in any significant impacts to this species or its habitat.

Likelihood of local extinction

It is considered unlikely that the proposed development would lead to the extinction of the local population of this species.

(b) In the case of an endangered ecological community or critically endangered ecological community whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable to threatened flora species.

(c) In relation to the habitat of a threatened species or ecological community:

- *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

Proposed clearing activities are not considered to represent further removal of modification of habitat for these species.

- *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

Native vegetation on the site is already fragmented and has a history of disturbance from past land clearing and grazing. The proposed development is unlikely to contribute significantly to an increase in the fragmentation of native vegetation communities.

- *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

The importance of disturbed areas of mainly exotic/pasture grasslands to be removed are minor when compared to the more intact areas with greater conservation significance being retained on the subject site (i.e. VZ1 and VZ2) and within the broader locality. The assessment of the importance of the habitat to be removed has taken into consideration the stages of relevant flora and fauna life cycles and how reproductive success may be affected. It is considered that the removal of the vegetation will not significantly affect the life cycle or reproductive success of native flora and fauna species or ecological communities in the locality.

(d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

There will be no adverse effects on any of the critical habitats listed under the *Biodiversity Conservation Act (2016)* from the action proposed.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to increase the impact of a key threatening process.

An assessment of the proposed development against the Key Threatening Processes (KTP) listed in Schedule 4 of the BC Act (2016) has been completed (**APPENDIX 5**). It is considered that the proposed development is unlikely to result in the exacerbation of any KTP's to the point where threatened flora species or their habitats are likely to be significantly impacted.

Threatened fauna species

(a) In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Australia painted snipe (Rostratula australis)

Extent of the local population

The BioNet database contained no records of this species within 10 kilometres of the subject site.

This species was not recorded from the subject site however potentially suitable habitat is considered to occur within the less disturbed/low-lying areas of the site i.e. VZ2.

The local population of this species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.

Stages of the life-cycle affected by the proposed development

The Australian painted snipe is small freshwater wader that inhabits the fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Most records of the species are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys.

The Australian painted snipe forages nocturnally on mud-flats and in shallow water where it feeds on worms, molluscs, insects and some plant-matter. Breeding is often in response to local conditions, generally occurring from September to December. The species nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists

of a scrape in the ground, lined with grasses and leaves. Incubation and care of young is all undertaken by the male only.

The OEH Threatened Species Unit discusses the following threats for the Australian painted snipe:

- Drainage of breeding sites in wetlands.
- Reduced water quality from siltation and pollution.
- Predation by foxes and feral cats.
- Use of herbicides, insecticides and other chemicals near wetlands.
- Grazing and associated frequent burning of wetlands.
- Exotic weeds and invasive native plants degrading wetland habitat.
- Poor understanding of the species' breeding ecology.

This species has not been recorded from the subject site. The proposed development will result in the loss of a small amount (0.18 ha / 2.4%) of potentially suitable habitat for this species. With implementation of recommended amelioration measures, the proposed development is not considered likely to result in any significant impacts to this species or its habitat.

Likelihood of local extinction

It is considered unlikely that the proposed development would lead to the extinction of any local population of this species.

(b) In the case of an endangered ecological community or critically endangered ecological community whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable to threatened fauna species.

(c) In relation to the habitat of a threatened species or ecological community:

- *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*

Proposed clearing activities are not considered to represent further removal of modification of habitat for these species.

- *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*

Native vegetation on the site is already fragmented and has a history of disturbance from past land clearing and grazing. The proposed development is unlikely to contribute significantly to an increase in the fragmentation of native vegetation communities.

- *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

The importance of disturbed areas of mainly exotic/pasture grasslands to be removed are minor when compared to the more intact areas with greater conservation significance being retained on the subject site (i.e. VZ1 and VZ2) and within the broader locality. The assessment of the importance of the habitat to be removed has taken into consideration the stages of relevant flora and fauna life cycles and how reproductive success may be affected. It is considered that the removal of the vegetation will not significantly affect the life cycle or reproductive success of native flora and fauna species or ecological communities in the locality.

(d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

There will be no adverse effects on any of the critical habitats listed under the *Biodiversity Conservation Act (2016)* from the action proposed.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to increase the impact of a key threatening process.

An assessment of the proposed development against the Key Threatening Processes (KTP) listed in Schedule 4 of the BC Act (2016) has been completed (**APPENDIX 5**). It is considered that the proposed development is unlikely to result in the exacerbation of any KTP's to the point where threatened fauna species or their habitats are likely to be significantly impacted.

APPENDIX 5 – ASSESSMENT OF KEY THREATENING PROCESSES

A "threatening process" means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes (KTP) have been listed in Schedule 4 of the *BC Act (2016).*

Key Threatening Processes (Schedule 4):

- Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (Manorima melanocephala)
- Alteration of habitat following **subsidence due to longwall mining**
- **Alteration to the natural flow regimes** of rivers, streams, floodplains & wetlands
- Anthropogenic Climate Change
- **Bushrock Removal**
- **Clearing of native vegetation**
- Competition and grazing by the **feral European rabbit (***Oryctolagus cuniculus***)**
- Competition and habitat degradation by feral goats (*Capra hircus*)
- Competition from **feral honeybees (***Apis mellifera***)**
- Death or injury to marine species following capture in **shark control programs on ocean beaches**
- Entanglement in, or ingestion of **anthropogenic debris in marine and estuarine environments**
- Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners
- Habitat degradation and loss by feral horses
- Herbivory and environmental degradation caused by **feral deer**
- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition
- Importation of **Red Imported Fire Ants** (*Solenopsis invicta*)
- Infection by **Psittacine Circoviral (beak & feather) Disease** affecting endangered psittacine species and populations
- Infection of frogs by amphibian chytrid causing the disease chytridiomycosis
- Infection of native plants by *Phytophthora cinnamomi*
- Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae
- Introduction of the Large Earth Bumblebee (*Bombus terrestris*)
- Invasion and establishment of **exotic vines and scramblers**
- Invasion and establishment of Scotch Broom (*Cytisus scoparius*)

- Invasion and establishment of the **Cane Toad** (*Bufo marinus*)
- Invasion, establishment and spread of (Lantana camara)
- Invasion of native plant communities by African Olive (*Olea europaea* subsp. *cuspidata*)
- Invasion of native plant communities by *Chrysanthemoides monilifera*
- Invasion of native plant communities by **exotic perennial grasses**
- Invasion of the **yellow crazy ant** (*Anoplolepis gracilipes*)
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants
- Loss of hollow-bearing trees
- Loss and degradation (or both) of **sites used for hill-topping by butterflies**
- Predation and hybridisation by Feral Dogs (*Canis lupus familiaris*)
- Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish)
- Predation by the **European Red Fox (***Vulpes vulpes***)**
- Predation by the **Feral Cat (***Felis catus***)**
- Predation by the **Ship Rat (***Rattus rattus***) on Lord Howe Island**
- Predation, habitat degradation, competition and disease transmission by **Feral Pigs** (*Sus scrofa*)
- Removal of **dead wood and dead trees.**

It is not considered that the proposed development will contribute significantly to the majority of the above listed Key Threatening Processes.

The proposed development will include a very minor contribution towards the **'Clearing of native vegetation'**. The final determination of the NSW Scientific Committee notes that clearing of native vegetation is recognised as a major factor contributing to loss of biological diversity, with impacts such as: destruction of habitat; fragmentation of habitat; riparian zone degradation; increased greenhouse gas emissions; increased habitat for invasive species; loss of leaf litter layer; loss or disruption of ecological function (*e.g.* loss of populations of pollinators or seed dispersers) and changes to soil biota.

Habitat loss is the main threatening process affecting all subject species. The proposed development will make a very minor contribution towards the loss of habitat in the region. However, as previously discussed, the vegetation to be lost has been highly disturbed by past land use activities and does not provide significant habitat for native species, in particular threatened species.

The Proposed development is not likely to increase the impact of any other key threatening processes.